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OVARIAN AND UTERINE TUMOURS

ON

OVARIAN AND UTERINE TUMOURS

THEIR DIAGNOSIS AND TREATMENT

BY

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PREFACE

It is now twenty-four years since I first attempted Ovariotomy. During this time I have offered to my professional brethren no less than three books upon the subject, each of them marking a stage in the progress of the operation.

The first book was published in 1864, when everything was tentative, facts were accumulating, and the bases of the rules of future action were being laid down. It was rather the fulfilment of a pledge to record all that I did, so as to furnish the means of judging how far my proceedings were justified, than a guide for other practitioners. It contained many useful lessons, and opened up for discussion almost all the important practical questions.

My second book, which appeared in 1872, was the result of much larger experience, and gave me the opportunity of speaking with more authority on points which I had been able to study, and of laying before the profession the views and mode of practice which I had then adopted. The weight of its evidence definitely settled all doubts as to the utility of Ovariotomy, and stimulated into activity many coadjutors. Ovariotomy is no longer an isolated part of surgery The last ten

years' practice in abdominal surgery have thrown open a much wider field of observation and yielded a fund of invaluable record. And this I have ranged over and sifted sedulously in search of instruction, adjusting to my various exigencies every suggestion which I considered, or which promised, to be an improvement. I thankfully acknowledge a great gain of knowledge, which has led to some changes of opinion and to some modification of my operative work.

The book which I now issue is professedly a second edition of that of 1872, but so far as the operation of Ovariotomy is concerned it is almost new, and as regards the uterine section still more so. There will be found in it the most recent information I have been able to collect and the results of my latest efforts. It is satisfactory to find that everywhere there are proofs of the extension of our beneficent work and of increasing success. Yet I am still a student among many fellow workers, and await the fruits of further research. For however much we may congratulate ourselves upon what has been done in the way of operation to save those who demanded help in the last extremity, the scientific aspect of the subject of ovarian and uterine tumours leads us to look for the restriction of the area for the application of our surgical measures, and to hope that the pathological industry of those who are not overwhelmed with the routine of mere clinical labour will bring us to such an understanding of the origin, causes, and nature of these diseases as will give us the means of arresting their development and progress, and will shield us from the reproach of being able only to offer the ultimate resource of relief by excision.

In the arrangement of the matters of which I had to write into chapters I have so strictly followed the natural divisions of the subject, that a reader wishing to inform himself on any particular question will be led to it at once by the table of contents; and I have preferred using this form of clue to that of an alphabetical index on account of its simplicity and directness. The line of demonstration and of argument can be traced at a glance, and the place of every record of fact, or reference to authority, is exactly indicated by name and page.

Up to May 1, 1882, my completed cases of Ovariotomy amount to 1071, and of the seventy-one following the one thousand upon which all the calculations in the text are founded only four have died, while sixty-seven have recovered; a further proof, if any were wanted, that notwithstanding the fact of my being often called upon to treat patients rejected by other surgeons as unfavourable cases, the progressive diminution of the mortality still continues. It is still more gratifying to be able to add that this increasing success is not confined to myself or to British surgeons, but is also established in Germany, France, and Italy. In addition to the facts summarised in the fifth Chapter, I have great pleasure in adding, at the last moment, that my friend Professor Schröder, of Berlin, who in his first hundred cases lost seventeen, and in his second eighteen, has only lost seven in his third series of one hundred cases just completed.

Upper Grosvenor Street:
May 1, 1882.

CONTENTS

INTRODUCTION

THE REPRODUCTIVE CELL—OVUM AND OVARY.

influence of the ovaries in health and disease, page 1.
interest of ovarian pathology, 1.
periodicity of female life, 2.
successive changes in ovarian structure and function, 2.
phenomena of ovulation, 3.
Graafian vesicles, 3.
corpora lutea, 3.
ovarian anomalies, 4.
displacements of the ovaries, 4.
modes of examination, 5–6.
hyperæmia and inflammation of the ovary often the origin of cystic tumours, 7.

CHAPTER I.

THE DIFFERENT KINDS OF OVARIAN TUMOURS.

Ovarian Tumours of three kinds; their Morphological Classification:

1. *Adenoid Tumours.*
   - *a.* hypertrophy of part or whole of the gland.
   - *b.* simple cysts—enlarged Graafian follicles.
   - *c.* multiple cysts—cysts in apposition forming multilocular tumours.
   - *d.* proliferous cysts—parent cysts with secondary cysts growing from the interior of cyst wall.
2. fibrous—growth of stroma of ovary.
3. malignant and tubercular—cancer, tubercle, 8.

Extra-Ovarian Tumours.

cysts of Fallopian tube and terminal vesicle
cysts of broad ligament or vesicles of Wolffian body.
cysts developed from tubules of parovarium.
cysts developed in the sub-peritoneal tissue of the pelvis and abdomen.
cysts developed from ova attached to the peritoneal surface, 8–9.

Descriptive Classification.

Simple Cysts.

1. ovarian—enlarged Graafian follicles.
2. extra-ovarian.
   - *a.* cysts of Wolffian body.
   - *b.* cysts of broad ligament.
   - *c.* cysts of Fallopian tube.
   - *d.* cysts developed in the sub-peritoneal tissue of the pelvis or abdomen.
   - *e.* cysts developed from aberrant ova.

Compound Adenoid Tumours.

1. multiple—cysts aggregated together.
2. proliferous—parent cysts, filled with cysts of secondary growth.

Fibrous, Malignant, and Tubercular Tumours, 9.

Simple Ovarian Cysts.

description and general characteristics, 9.
structure of cyst walls, histological elements, vascular condition, origin of cysts from diseased vessels, 10.
nerves and lymphatics, relation of Fallopian tube to cyst, origin of simple cysts, the ovum in simple cysts, morbid enlargement often the result of follicular hæmorrhage, 11.
cysts from corpus luteum, description of by Rokitansky, hyperæmia cause of cystic degeneration, opinions of Scanzoni, Klob, and Schultze, 12.
Views of Grohe, effects of congestion and local inflammation, 13.

Simple Extra-Ovarian Cysts.

on the broad ligament, ordinary conditions of, 14.
illustrative case, cysts described by Huguier, 15.
cysts developed from ova attached to the peritoneum, suggestions by Boinet and Ritchie, 16.

Tubo-Ovarian Cysts.

described by Richard and Labbé, mode of origin, 17.
cases by author and Dr. Beale, 18.

Multiple Ovarian Cysts.

begin by the coincident enlargemen of several Graafian follicles, 19.
their growth and structural changes, 20.
other modes of origin in the stroma of ovary, 21.
Leopold, of Leipsig, and Cohnheim on the persistence and transplantation of embryonic tissues, 22.

Proliferous Cysts.

description and mode of origin, 23.
secondary cysts developed from epithelium of the parent cyst, epithelial transformations, 24.

secondary cysts from Graafian follicles in cyst walls, ova observed in them by Rokitansky and Ritchie, 25.
Ritchie on the formation of cysts from follicles and ova, 26.
Ritchie on the presence of ova in the loculi of ovarian cysts, 27.
Wilson Fox on the origin of ovarian cysts, 28.
case described by author as a enoma, 29.
Fox on epithelial and colloid growths, 30–31.
Harris and Doran on the earlier stages of cystic disease, 32-34.

Dermoid Cysts.

another form of proliferous cyst with higher development, new formations and arrest of growth, discharge of contents, muscular fibre observed by Virchow, 35.
other tissues reported by various authors, case by Friedreichs, 36.
not exclusively ovarian, found in males, 37.
description of dermoid tumours and their contents, 38.
not the result of impregnation, doctrine of continuous development, 39.
extra-uterine fœtation, no analogy with dermoid tumours, 'monstrosities by inclusion,' duration of dermoid tumours, 40.
formative power in ovarian cysts, 41.
cases operated on by author, 42–43.

Cystosarcoma.

description of, hyperplastic condition of cell walls, 44.
cases of, 45–47.

Fibrous Tumours of Ovary.

of rare occurrence, two cases reported by Kiswich, 47.
the author's experience confined to three cases, in one of which both ovaries were in the same condition, 48.
case presented to the Obstetrical Society, 48.

Cancer of the Ovary.

no special form of cancer in the ovary, its structure and constituent tissues prefigure the various types of disease, 49.
Paget on hard cancer of the ovary, 49.
tendency of cystic tumours to degenerate into the colloid form, an intermediate condition between simple cyst and malignant growth, description, mode of growth, alveoli and contents, 50.
case illustrating the progress of the disease, report of post-mortem by Mr. Jardine, 51.
dendritic growths in cysts degenerate into epithelioma and medullary cancer, 51.
cancer sometimes primary affection of the ovary, without cyst formation, 53.
cancer of both ovaries, 54.
cancer of one ovary, with cystic disease of the other, 55.
cancer involving both ovaries in a child, account of case and post-mortem, 56–58.

Tubercle of the Ovary.

Rokitansky denied the fact of its occurrence, 58.
report by Wilson Fox on cyst removed by author, 58.
author has seen several other cases, 59.

The Pedicle.

structure of, 59.
peculiarities of, 60.
rotation of tumours first described by Rokitansky, 61.
direction, extent, and consequences of twisting of the pedicle, 62.
constriction of vessels, hæmorrhage and rupture of the cyst, atrophy and subsidence of the tumour, division of the pedicle, transplantation of tumour, and nutrition through vessels of adhesions, 62.
two cases of removal of such self-grafted tumours, 62–63.
death from hæmorrhage into a rotated cyst, 63.
recovery after cystic hæmorrhage from rotation, 64.
sessile tumours without pedicle, enucleation of, 65.

Degeneration of Cyst Walls.

liability of ovarian cysts to inflammation, formation of adhesions and pus, contents sometimes find their way into other organs, septic and pyæmic fever, 65.
perforation and passage of fluids into the peritoneal cavity, no bar to operation, 66.
case illustrating this point of practice, 67.
anæmic condition of the tissues, fatty degeneration, 68–69.
chalky deposit in cyst walls, 70.

CHAPTER II.

DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS.

many of the signs and symptoms common to the whole group, physical signs in connection with the nature of the contents, evidence of symptoms more circumstantial than specific, 71.
age of patients, side of disease, duration, 72.

Diagnosis of the Different Kinds of Ovarian Tumours and their Adhesions.

diagnosis of solid tumours, 73.
diagnosis of simple cysts, 74.
diagnosis of multilocular cysts, 75.

Adhesions.

adhesions to abdominal wall do not much affect the general results of ovariotomy, 76.
position of patient for examination, evidence from respiratory movements and sounds on percussion, 77.
crepitus and friction sounds, difference between those produced by omentum and adhesions, 78.
pelvic adhesions of more importance, 79.

Differential Diagnosis of Ovarian Tumours.

enumeration of the principal states and diseases which may throw doubt on the diagnosis, 80–81.
mechanical interference of tumours with the action of thoracic, abdominal, and pelvic organs, 81.
effect on physiognomy, 82.

local effects of ovarian tumours, 83.
thoracic alterations often impeding recovery after tapping and ovariotomy, 84.

Diagnosis between Ovarian Dropsy and Ascites.
inspection—form, appearance of superficial veins, varicose lymphatics, movements during respiration, 85–86.
measurement—circular at level of umbilicus, radiating from umbilicus to sternum, pubes, and crest of ilium, 87.
palpation—showing resistance of abdominal wall, variations of fluctuation and distension, 87.
percussion and auscultation—practical remarks on the evidence of fluctuation, 88–89.
auscultation alone affords little information, 89.
chemical and microscopical examination of ovarian fluids, 90.
composition and chemical constituents of ovarian fluids, 91–94.
recent investigations by Dr. C. Méhu, 95–96.
microscopical evidence uncertain, 96.
sometimes useful in showing the existence of malignant degeneration, observations of Foulis and Thornton, 97–98.

Diagnosis of Encysted Dropsy and Changes produced by Chronic Inflammation and Cancer of the Peritoneum.
peritoneal fluid sometimes confined in pouches, remarks by Dr. West, 98.
distinguishing signs, 99.
case of chronic peritonitis, 99.
tubercular peritonitis, 100.
case of tubercle and ascites, 101–102.
deceptive symptoms of cancer of peritoneum, 102.
case, with report of examination, 103–104.
piliferous cyst of ovary with malignant disease of abdomen, 105.
indications of malignant disease accompanying ovarian cysts, 106.

Tympanites and Phantom Tumours.
observations of Bright and Simpson, 106.
cases of hysteric tympanites, 107–110.
sometimes accompanies uterine and ovarian disease, and pregnancy, 110.
once seen by author in a man, 111.

Fibro-Plastic and Fatty Tumours of Peritoneum, Omentum, and Sub-Peritoneal Cellular Tissue.
real nature only determined in some cases by tapping or exploratory incision, 111.
case of fatty tumour partially removed, 111.
case of fibro-plastic tumour, with report by Wilson Fox, 112.
tumour removed by author, and described by Virchow as 'fibroma molluscum cysticum abdominale,' 113–114.
myxoma-lipomatodes recurrent, 115.

Hydatids.
their diagnosis from ovarian tumours, 115.
cases of hydatids of peritoneum, 116–117.
not found in substance of the ovary, 118.

Pregnancy.

common cause of error in diagnosis, not important at an early period, 119.

diagnosis influenced by considerations of age of patient, condition of the organs of generation, size and position of the swelling, duration of its growth, disturbance of functions, state of general health, and physiognomy, 120.

symmetry of the abdomen, condition of superficial veins, sounds of the fœtal heart, 121.

fluctuation, ballottement, state of the os uteri, 122.

extra-uterine fœtation, question often decided by early death of the patient, diagnosis after third or fourth month, 123.

uterine enlargements without pregnancy, hydatids, polypus, cancer, hæmatometra, hydrometra, physometra, 124.

summary of signs of ovarian enlargement, 125.

Renal Cysts and Tumours.

mistaken diagnosis exceptional, 126.

case of soft cancer of the right kidney in a child four years old, 127.

remarks by Dr. Roberts, of Manchester, 128.

position of the tumour in renal cysts, 128.

absence of fluctuation, 129.

case of pyonephrosis, 130–131.

peri-renal abscess, removal of renal calculus, 132.

case of cystic degeneration of the kidney mistaken for ovarian cyst, operation, post-mortem, and previous history, 132–136.

rupture of renal cyst, 137.

exploratory incision in a case of renal cyst, 138.

exploratory incision for renal cyst followed by uræmic fever, 139–140.

summary of diagnosis of renal cysts, 141–143.

Distended Bladder.

of common occurrence with both uterine and ovarian tumours, has been mistaken for cystic tumour, necessity for using a long catheter, 143.

Fæcal Accumulations.

remarks by Simpson, 144.

case of, resembling an ovarian cyst requiring a modified Nélaton's operation, 145.

Pelvic Cellulitis and Abscess.

many supposed cases of cure of ovarian and uterine tumours really pelvic abscesses, distinguishing symptoms, 146.

Hæmatocele.

often the cause of pelvic cellulitis and abscess, only when large and sudden that it forms an abdominal tumour, more frequently pelvic, 147.

more rapidly developed and attended by severer symptoms than ovarian cysts, 148.

case illustrating the course and danger of the disease, 148.

other diseases mistaken for ovarian cysts, 149.

CHAPTER III.

THE MEDICAL TREATMENT OF OVARIAN TUMOURS.

generally unsatisfactory, for the most part palliative, 150.
importance of avoiding pregnancy and guarding against accidents causing inflammation or rupture, 151.
specific remedies have mostly proved useless and often injurious, case of exceptional cure by purgatives, 152.
question of time for surgical interference, 153.
enumeration of minor methods of surgical treatment, 154.

CHAPTER IV.

ON THE PALLIATIVE AND MINOR SURGICAL TREATMENT OF OVARIAN TUMOURS.

Tapping.

absolutely forbidden by Stilling, objected to by many other surgeons, 155.
erroneous notions as to the fatality of tapping, remarks on the danger of the operation, 156.
may be practised simply or with various combinations of drainage and pressure, 157.

Tapping through the Abdominal Wall.

how done formerly and the consequences, 157.
Simpson's calculation that the mortality was one in six, certainly not one in sixty in author's experience, precautions to be observed, and modifications in the mode of operation, 158.
condition of the cyst wall sometimes the cause of difficulty from partial thickness or bony deposit, 159.
improvements in the trocar, Mr. Thompson's trocar, 159.
description and mode of use, 160.
modifications of the syphon trocar, 161.
with syringe, action may be reversed for washing out cysts, 162.
used instead of aspirators, 163.
bleeding after tapping, and the treatment required, 163–164.
cases showing the success of tapping in some cases of single cysts, 165–166.
author's experience in accord with the conclusions of Dr. Méhu, 166.
influence of tapping on ovariotomy, table, 167.
does not affect the result of the operation by more than 2 per cent., 167.
practical conclusions in reference to tapping, 168.

Tapping through the Vagina.

more dangerous than tapping through the abdominal wall from the probable entrance of air, putrefaction, and septicæmia, should be an exceptional practice, may be necessary when a cyst is bound

down by adhesions in the pelvis, means of preventing the canula from slipping out and the wound closing, 169.
cases successful and unsuccessful with drainage, 170–175.
simple tapping more hazardous than when followed by drainage, drainage should be continued till the cavity is obliterated, better to remove a cyst, if possible, than to trust to drainage, 176.

Tapping through the Rectum.

supposed by some to have advantages over tapping by vagina, no practical proof of this, 176.

Injection of Iodine.

strongly advocated by Boinet, now fallen into desuetude, simple tapping quite as effectual in proper cases, 177.
useful for washing out drainage cases, sulphurous acid preferable, 177.

Treatment by Incision.

how it probably originated, more dangerous than ovariotomy, how practised by some surgeons, only admissible when ovariotomy cannot be completed, 178.

CHAPTER V.

THE RISE AND PROGRESS OF OVARIOTOMY.

derivation of the name, notices by ancient writers, 179.
practised by the natives of Australia and New Zealand, proposed in the 17th century for the treatment of nymphomania and dropsy of the ovaries, 180–181.
only generally adopted as a means of radical cure within the last five-and-twenty years, 181.
quotations from the writings of Dr. W. Hunter and John Hunter, 182.
advocated by Chambon in 1798, 183.
lectures on the subject by John Bell attended by McDowell, 184.
McDowell the first successful ovariotomist, 184.
reasons why it was not earlier adopted in this country, 185.
McDowell's first operation in 1809, 186.
his character as a surgeon, 187.
cases reported as ovariotomy, 188.
ovariotomy attempted by Houston, 1701, 189.
McDowell's subsequent cases, 190.
cases by Smith, of Connecticut, 1822, 190.

Ovariotomy in Great Britain.

unsuccessful cases by Lizars and Granville, 191.
first successful case by Jeaffreson, 1836, 191.
other cases by King, West, and Crisp, 191.
operation first completed in London by Benjamin Phillips, 1840, 192.
Dr. Clay, of Manchester, began in 1842, 192.
first successful case in London by Walne, 1842, other operations in England to 1846, 192.

Mr. Solly's lecture on pedicle, 1846, 192.
first successful ovariotomy in a London hospital by Mr. Cæsar Hawkins, 1846, 193.
other English operators between 1846 and 1850, 193.
Duffin's views on the treatment of the pedicle, his publication, effect of, 1850, not a mere imitator of Stilling, 193–195.
Einnähen, or 'pocketing the pedicle' of Langenbeck and Storer, 195.
the Samaritan Hospital, its beginning, my first connection with it in 1854, my first experience of ovariotomy in 1854 with Baker Brown, and Nunn, absence in the Crimea, 1855–56, 195.
beginning of operative work at the Samaritan by Snow Beck, 196.
my first exploratory incision for ovarian disease in 1857, first ovariotomy in 1858, 196.
removal of the Samaritan Hospital, my second and third ovariotomies, 197.
my fourth operation fatal, post-mortem by Dr. Aitken, 197.
led to experiments on animals, useful results of, practice in 1859, 198.
progress of ovariotomy during the next five years, 199.
publication of my first book in 1864, reasons for and account of, 199–200.
questions under discussion at that time, length of incision, 200.
treatment of pedicle, 201.
the clamp and modifications of, 202–203.
its use in extra-peritoneal treatment of the pedicle, 204.
inducements to follow the extra-peritoneal treatment of the pedicle, 205.
position of the patient under ovariotomy, my preference for the recumbent position, operating tables, 206.
closure of the wound, trial of various methods leading to adoption of sutures, 207–208.
symptoms at that time often misunderstood, 209.
vague notions about septicæmia, practical lessons from early cases, 210.
origin of antiseptics, 211.
completion of five hundred cases in 1872, publication of my second book, 212.
introduction of methylene, 212.
novelties in hospital practice, 213.
end of my hospital work, 1877, 214.
results of hospital work, 214.
address on leaving hospital, 215–216.
practice of my colleagues in hospital, 217.
private practice after leaving hospital, 218.
additions to my antiseptic precautions, 219.
recent modifications in my ovariotomy practice and results, 220–221.
mortality before and after antiseptics, 222.
objections to Lister's spray, 223.
report of practice of Dr. Keith, 224.

Ovariotomy in France.

early opposition by Velpeau, 225.
advocated by Cazeaux and Worms, 225.

investigations and example of Nélaton, 225.
operation first undertaken by provincial surgeons, 225.
practice of Kœberlé, report of Péan, 226.

Ovariotomy in Belgium.
first done by me in Brussels, 1865, 226.
practice of Boddaert and Deroubaix, 227.

Ovariotomy in Switzerland.
first done by me in Zurich, 1864, 227.
report by Kocher on operations done by himself and other Swiss surgeons, 228.

Ovariotomy in Germany.
begun by Chrysmar and Dzondi, 1819–1820, 228.
early experience of other surgeons, 228.
publication of Grenser's work, progress to 1871, 229.
letter from Billroth, 230.
Olshausen's report to 1877, 230.
operations by Schroeder and Nussbaum to 1881, 231.
operations by Olshausen, 232.
operations by Billroth, tables, 234 235.
remarks by Billroth, 235.

Ovariotomy in the North of Europe.
in Sweden by Sköldberg, 235.
in Denmark, 236.
in Norway, report by Nicolaysen, 236–237.
in Russia, first done by Vanzetti, 1846, report of Krassowski on operations by native surgeons, 238.

Ovariotomy in Italy.
first successful case by Landi, of Pisa, 1868, progress since, 238.
History of supposed early case in 1815, 239–241.

Ovariotomy in other Countries, India and the Colonies, 241.
Ovariotomy in America, 242.

CHAPTER VI.

OVARIAN DISEASE IN ENGLAND, AND THE CONDITIONS AFFECTING THE OPERATION OF OVARIOTOMY.

Statistics of Ovarian Disease.
deaths from ovarian dropsy, 243.
deaths from ovariotomy, 243.
progress of registration, proportion of ovarian disease among female population, 244.
mortality of ovarian disease in England, remarks by Dr. Ogle, 245–246.

The Question of Operative Treatment.
conditions which admit of temporary relief, 247.
conditions which indicate the propriety of surgical interference, 248.

reasons for not delaying ovariotomy, 249–250.
conditions affecting ovariotomy, 251.
size, 252.
adhesions, table showing the effect of adhesions upon the results, 253–254.
age, tables showing influence of upon results, 255–256.
mortality at different ages, 257.
conjugal condition, 258.
social condition, 259.
comparison of results in hospital, nursing homes, and private houses, 260.
influence of season, 261–263.
contra-indications, 264–265.

CHAPTER VII.

PREPARATION OF A PATIENT FOR OVARIOTOMY; DUTIES OF THE NURSE; DESCRIPTION OF NECESSARY INSTRUMENTS.

circumstances influencing the choice of time for operation, 266.
every case must be judged by its own peculiarities, physical condition of the patient, mental, moral, and social considerations, 266.
importance of attending to the secretions of the patient, medication, change of air, 267.
choice of place for operation, relative mortality in hospital and private practice, 268.
hospital mortality reduced by antiseptics, 269.
ventilation and bedding, 269.
nurses, qualifications, training, duties of, 270–271.
temperature of room, dress of patient, and management immediately before operation, 272.
tables for operation and arrangement of the patient, 273.
enumeration of necessary instruments and mode of disposing of them, 275.
anæsthetics, chloroform, methylene, 276.
methylene brought forward by Dr. Richardson and used for the first time in ovariotomy in 1867 in my 229th case, 276.
my experience of it in about 1,500 operations, Dr. Junker's apparatus, 277.
the syphon trocar and its various modifications for ovariotomy, 278.
the cautery clamp, 279.
cauterizing irons and apparatus, 280–281.
the chain écraseur in ovariotomy, 281.
division of the pedicle by twisting, 281.
artificial light sometimes necessary, lamps and reflectors, 282.
other instruments required—torsion-forceps, pressure-forceps for temporary suppression of bleeding, my large pressure-forceps for compressing the pedicle before ligature, 283–284.

CHAPTER VIII.

THE OPERATION OF OVARIOTOMY; DIVISION OF THE ABDOMINAL WALL; SITUATION AND LENGTH OF INCISION; SEPARATION OF THE CYST; EMPTYING AND REMOVAL.

position of the surgeon, assistants, and nurses, 285.
selection of the linea alba for the incision in all my cases, and by most other surgeons, 285.
incisions practised by early operators, 286.
advantages of choosing the linea alba when practicable, 287.
structures divided in the linea alba, 288.
structures divided when the incision passes through one of the recti muscles or along one of the lineæ semilunares, 289.
anatomical account of the parts concerned in the incisions, 290–291.
incision through the integuments, 292.
mode of opening the peritoneum, 293.
important not to puncture the cyst at same time, 293.
double sharp hook of Adams and Key's director, 293.
influence of the length of the incision, tables of 1,000 cases, 294.
long incision preferable to incomplete operation, comparative advantages and mortality, 295.
precautions in opening the abdominal cavity, 296.
recognition of an ovarian tumour when exposed, sometimes made difficult by adhesions, 296.
importance of arresting bleeding before opening the peritoneum, use of pressure-forceps, ligatures, 296.
separation of cystic adhesions, generally yield to gentle manipulation, cutting rarely necessary, when so, great precaution required to avoid wounding viscera, 297.
how to act in case of accidental wound of intestine, 298.
tapping the cyst, mode of using the syphon trocar, 298.
precautions to be used when withdrawing the trocar, 299.
extraction of the cyst, manœuvre for preventing prolapse of the viscera, 299.
breaking up of large multilocular cysts, 300.
use of large flat sponge, 301.

CHAPTER IX.

TREATMENT OF THE PEDICLE; SPONGING OF THE PERITONEUM; CLOSING OF THE WOUND; ACCIDENTS DURING OPERATION.

treatment of pedicle either intra-peritoneal or extra-peritoneal, 302.
combined plan adopted by early operators, 302.
intra-peritoneal method originated by Dr. Nathan Smith in 1821, using ligatures, 302.
various modes of securing the pedicle when the intra-peritoneal treatment is followed, 303.

clamp or ligatures used for extra-peritoneal treatment, 303.
clinical remarks made in 1868 in reference to the use of the clamp, 304.
changes in the pedicle and ligatures when confined in the peritoneal cavity, 305.
experiments of Spiegelberg and Waldeyer on the effect of foreign bodies enclosed in the peritoneal cavity, 306.
on the capsulation of ligatures, 307.
on the local effects of ligatures, 308.
on the reparation of the cut surfaces of uterine tissue, 308.
on accidental adhesions of granulating tissues, 309.
effect of ligatures on the pedicle, examination of ligatures after ovariotomy, 310.
observations of the same author on the condition of cauterized stumps, 311.
observations of Maslowsky on the structural changes in cauterized and ligatured stumps, 312–315.
consideration of the objections to the clamp, or extra-peritoneal mode of treatment of the pedicle, 316.
treatment of the pedicle eclectic, but since antiseptics almost exclusively intra-peritoneal, 317.
choice between cautery and ligatures, 318.
importance of transfixing the pedicle when ligatures are used, 318.
manner of applying them, 318.
question of tightness of ligatures, 319.
ends of ligatures how dealt with, 320.
material for ligatures and mode of preparing silk, 320.
acupressure of the pedicle once tried by Simpson successfully, 321.
division of the pedicle by the écraseur, 322.
the cautery alone often fails in stopping bleeding from large vessels—same defect with the écraseur, 322.
combination of crushing and cautery as introduced by Clay, of Birmingham, and practised by Keith effectual, 322.
drawbacks to the use of the cautery, 322.
Clay's cautery clamp and irons, modifications of, electric cautery, and Paquelin's cautery, 323.
my clamp as formerly used in intra-peritoneal treatment of the pedicle, 324–325.
results of various modes of treating the pedicle, tables of 1,000 cases, 326–327.
after securing the pedicle, precautions to be taken for preventing contents of cyst passing into the abdominal cavity, to arrest bleeding from the vessels of adhesions, 327.
examination of the second ovary and uterus, and exploration of the abdominal cavity before closing the wound, 328.
cleansing the peritoneal cavity, use of sponges, removal of blood-clots and fluids, 329.
closure of the wound, early practice, present use of carbolized silk, mode of inserting sutures, importance of including peritoneum in the sutures, 330.
external dressings, arrangement of the patient, and management of the stage of reaction, 331.

Accidents after Operation.

fainting, a few cases after early operations, none in second series, 331.
shock and hæmorrhage, 332.
suppurating and burst cysts have not much affected the success of the operation, 332.
injuries to viscera, cases and practical lessons, 333.
results of injuries to spleen, liver, and kidney, 334.
importance of taking account of the forceps and sponges before closing the wound, 335.
cases in illustration, 336.

CHAPTER X.

ON THE REMOVAL OF BOTH OVARIES AT ONE OPERATION.

importance of examining both ovaries in an operation of ovariotomy, circumstances determining what to do when appearances of disease are seen in the second, 337.
additional danger from removing both ovaries, proportional mortality in my practice, 338.
precautionary removal of a healthy second ovary to be refused, 338.
puncturing of distended follicles, 339.
statistics of removal of both ovaries at same operation, 339, 340.
treatment of the two pedicles, results of various modes of securing the two pedicles, 341.
table of 1,000 cases of completed ovariotomy, 342–393.

CHAPTER XI.

ON OVARIOTOMY PERFORMED TWICE ON THE SAME PATIENT.

first case in which I performed this operation in 1863, details and result of the second operation, 394–397.
lessons suggested by the history of this case, 398.
second case as reported in the 'Transactions' of the Medico-Chirurgical Society, 399–402.
subsequent history of patient, 403.
details of another case, second operation after an interval of seven years, 403–407.
fourth case, first operation with the écraseur, 408.
history after first operation, 409.
second operation with description of the tumour, 410 411.
mention of nine other cases, 412.
side on which the disease is most frequently found, 412.
table of thirteen cases in which ovariotomy was done twice, 413.
proportion of concurrent disease in both ovaries, 414.
recurrence of disease in ovary remaining after first operation, 415.

CHAPTER XII.

ON THE TREATMENT OF PATIENTS AFTER OVARIOTOMY.

local conditions for good nursing, 416.
duties and qualifications of a nurse, 417.
use of catheter, opiates, stimulants, 417.
pulse, temperature, and secretions, 417.
medical treatment, 418.
surgical treatment, examination and dressing of the wound, 419.
management and removal of sutures, 420.
treatment of pedicle when clamp has been used, 421.
symptoms indicating collection of fluid in the peritoneum, Kœberlé's drainage tubes, Peaslee's injections into peritoneum, 422.
drainage and injections, Scanzoni's trocar, 423.
case of vaginal drainage, 424.
the danger of puncture much exaggerated, mode of fixing canula in drainage cases, 425.
symptoms caused by obstructed intestines, 425.
case, with post-mortem examination, 426–427.
obstruction followed by perforation, 428.
reopening abdomen in cases of intestinal obstruction, 429.
small intestines in Douglas's pouch, 430.
adhesions there to pedicle sometimes cause of obstruction, 431.
obstruction followed by fæcal fistula, 431.
report of cases, 431–434.
adhesion of intestines to ligatured pedicle influenced me in favour of extra-peritoneal treatment, change of views and practice since antiseptics, 435.
tetanus after ovariotomy, my experience of, 435.
reports by Lyman and Olshausen, 436.
notes of my four cases, three occurred at early date, one in 1878, none since, 436.
generally attributable to chill from currents of air, 437.
treatment, only successful case in my practice treated with Woorara, opinion of Olshausen, pathological report by Harris and Doran, 437.

CHAPTER XIII.

OVARIOTOMY DURING PREGNANCY.

dangers arising from the complication of ovarian disease with pregnancy, 438.
practical questions in such cases, doing nothing, induction of premature labour, tapping, ovariotomy, 438.
natural course of pregnancy and labour in such cases exceptional, 439.
accidents to be apprehended, 439.
three cases of death from spontaneous rupture of ovarian cysts during pregnancy, 439–443.

two cases of successful ovariotomy during pregnancy, 444.
tapping during pregnancy, case, 444.
case of ovariotomy and Cæsarean section, 445.
unsuspected pregnancy sometimes discovered during ovariotomy, cases, practical questions, 446.
practice to be followed in the event of an accidental opening of the uterus, 446.
case of ovariotomy at the fourth month of pregnancy, 447.
ovariotomy at the third month of pregnancy, 448.
ovariotomy at the second month of pregnancy, 449.
removal of ovarian fibroid during pregnancy, 450–452.
five other cases of ovariotomy during pregnancy, 452–454.
practical conclusions, 454–455.
table of ten cases, 456.

CHAPTER XIV.

ON INCOMPLETE OVARIOTOMY AND EXPLORATORY INCISIONS.

uncertain record of early cases of ovariotomy and incomplete operations, my resolution from the first to publish every case whether complete or incomplete, 457.
has resulted in giving an opportunity of forming a correct estimate of the progress and value of the operation, remarks on the tables of cases of incomplete operations coincident with my first series of 500, 458.
remarks upon the total number of my incomplete operations, have almost always confirmed previous suspicions, the general accuracy of diagnosis at the present time, other surgical investigations and operations subject to similar uncertainty, 459.
proportion and diminishing frequency of incomplete operations, 460.
results of incomplete operations to the year 1872, 460.
three cases in which the incomplete operation was followed by restoration to health, 461–462.
result of 33 cases of incision and incomplete operation during the time of my second series of 500 cases of ovariotomy, 463.
details of case of recovery and recurrence after five years, 463.
procedure when completion of ovariotomy is impossible, 464.

CHAPTER XV.

RECENT EXTENSIONS OF OVARIOTOMY.

castration not a practice of civilized life, 465.
Battey's proposal in 1872 made independently of any knowledge of Blundell's suggestion in 1823, 465.
a proceeding not in accordance with scientific principles, but expedient, object proposed by Battey, Hegar's extension of the suggestion, report of cases by Dr. Paul St. Mundé, 466.
my own experience confined to four cases, 466.

principle of Battey's operation limited in its application and liable to abuse, Hegar's suggestion less questionable, 467.
conditions justifying the operation of removal of the ovaries very rare, as shown by Battey's experience as well as my own, 467.
report of my first case in 1878, 468.
conclusions drawn from consideration of this case and subsequently confirmed, vaginal oöphorectomy exceptional, the abdominal section to be preferred, cautions as to the performance of both operations, 469.
operation not repeated for nearly four years; my second operation in 1881, 469.
protest against the frequency of this operation, Dr. Weir Mitchell's treatment of the cases often selected for it, Dr. Playfair's remarks, 470.
Dr. Barnes on hernia of the ovary justifying oöphorectomy, remarks by Mr. Hulke and Mr. Langton; numbers given by Agnew, 471.

CHAPTER XVI.

RESULTS OF OVARIOTOMY, AND SUBSEQUENT HISTORY OF PATIENTS WHO RECOVERED.

the principle of the operation justified by the results, 472.
mortality less than that after most capital operations, restoration to perfect health more frequent, 472.
fears that patients after ovariotomy would suffer some special inconveniences imaginary, 473.
correspondence with patients after ovariotomy, circular sent to all patients who had recovered after ovariotomy, 473.
summary of the answers returned, numbers of living and dead, cause of deaths since recovery after operation, number of children born of women married at time of operation, number of women single at time of operation and married since, 474.
number of children result of these marriages, 475.
case reported by Mr. Whitmarsh, of Hackney. 475.
condition after removal of both ovaries, peculiarities of a few cases, 475–476.
such an inquiry after a capital operation unique, 476.
health of patients generally restored, 476.
remaining ovary found to perform its functions naturally, 477.
recurrence of ovarian disease not common, 478.
proportion in my practice, 478.
first operation no bar to the performance of a second if necessary, 478.

CHAPTER XVII.

ON UTERINE TUMOURS.

the practice of ovariotomy has led to a better acquaintance with the prevalence of uterine tumours, 479.
many of the largest abdominal tumours are uterine, 479.

Accidents after Operation.

fainting, a few cases after early operations, none in second series, 331.
shock and hæmorrhage, 332.
suppurating and burst cysts have not much affected the success of the operation, 332.
injuries to viscera, cases and practical lessons, 333.
results of injuries to spleen, liver, and kidney, 334.
importance of taking account of the forceps and sponges before closing the wound, 335.
cases in illustration, 336.

CHAPTER X.

ON THE REMOVAL OF BOTH OVARIES AT ONE OPERATION.

importance of examining both ovaries in an operation of ovariotomy, circumstances determining what to do when appearances of disease are seen in the second, 337.
additional danger from removing both ovaries, proportional mortality in my practice, 338.
precautionary removal of a healthy second ovary to be refused, 338.
puncturing of distended follicles, 339.
statistics of removal of both ovaries at same operation, 339, 340.
treatment of the two pedicles, results of various modes of securing the two pedicles, 341.
table of 1,000 cases of completed ovariotomy, 342–393.

CHAPTER XI.

ON OVARIOTOMY PERFORMED TWICE ON THE SAME PATIENT.

first case in which I performed this operation in 1863, details and result of the second operation, 394–397.
lessons suggested by the history of this case, 398.
second case as reported in the 'Transactions' of the Medico-Chirurgical Society, 399–402.
subsequent history of patient, 403.
details of another case, second operation after an interval of seven years, 403–407.
fourth case, first operation with the écraseur, 408.
history after first operation, 409.
second operation with description of the tumour, 410 411.
mention of nine other cases, 412.
side on which the disease is most frequently found, 412.
table of thirteen cases in which ovariotomy was done twice, 413.
proportion of concurrent disease in both ovaries, 414.
recurrence of disease in ovary remaining after first operation, 415.

CHAPTER XII.

ON THE TREATMENT OF PATIENTS AFTER OVARIOTOMY.

local conditions for good nursing, 416.
duties and qualifications of a nurse, 417.
use of catheter, opiates, stimulants, 417.
pulse, temperature, and secretions, 417.
medical treatment, 418.
surgical treatment, examination and dressing of the wound, 419.
management and removal of sutures, 420.
treatment of pedicle when clamp has been used, 421.
symptoms indicating collection of fluid in the peritoneum, Kœberlé's drainage tubes, Peaslee's injections into peritoneum, 422.
drainage and injections, Scanzoni's trocar, 423.
case of vaginal drainage, 424.
the danger of puncture much exaggerated, mode of fixing canula in drainage cases, 425.
symptoms caused by obstructed intestines, 425.
case, with post-mortem examination, 426–427.
obstruction followed by perforation, 428.
reopening abdomen in cases of intestinal obstruction, 429.
small intestines in Douglas's pouch, 430.
adhesions there to pedicle sometimes cause of obstruction, 431.
obstruction followed by fæcal fistula, 431.
report of cases, 431–434.
adhesion of intestines to ligatured pedicle influenced me in favour of extra-peritoneal treatment, change of views and practice since antiseptics, 435.
tetanus after ovariotomy, my experience of, 435.
reports by Lyman and Olshausen, 436.
notes of my four cases, three occurred at early date, one in 1878, none since, 436.
generally attributable to chill from currents of air, 437.
treatment, only successful case in my practice treated with Woorara, opinion of Olshausen, pathological report by Harris and Doran, 437.

CHAPTER XIII.

OVARIOTOMY DURING PREGNANCY.

dangers arising from the complication of ovarian disease with pregnancy, 438.
practical questions in such cases, doing nothing, induction of premature labour, tapping, ovariotomy, 438.
natural course of pregnancy and labour in such cases exceptional, 439.
accidents to be apprehended, 439.
three cases of death from spontaneous rupture of ovarian cysts during pregnancy, 439–443.

two cases of successful ovariotomy during pregnancy, 444.
tapping during pregnancy, case, 444.
case of ovariotomy and Cæsarean section, 445.
unsuspected pregnancy sometimes discovered during ovariotomy, cases, practical questions, 446.
practice to be followed in the event of an accidental opening of the uterus, 446.
case of ovariotomy at the fourth month of pregnancy, 447.
ovariotomy at the third month of pregnancy, 448.
ovariotomy at the second month of pregnancy, 449.
removal of ovarian fibroid during pregnancy, 450–452.
five other cases of ovariotomy during pregnancy, 452–454.
practical conclusions, 454–455.
table of ten cases, 456.

CHAPTER XIV.

ON INCOMPLETE OVARIOTOMY AND EXPLORATORY INCISIONS.

uncertain record of early cases of ovariotomy and incomplete operations, my resolution from the first to publish every case whether complete or incomplete, 457.
has resulted in giving an opportunity of forming a correct estimate of the progress and value of the operation, remarks on the tables of cases of incomplete operations coincident with my first series of 500, 458.
remarks upon the total number of my incomplete operations, have almost always confirmed previous suspicions, the general accuracy of diagnosis at the present time, other surgical investigations and operations subject to similar uncertainty, 459.
proportion and diminishing frequency of incomplete operations, 460.
results of incomplete operations to the year 1872, 460.
three cases in which the incomplete operation was followed by restoration to health, 461–462.
result of 33 cases of incision and incomplete operation during the time of my second series of 500 cases of ovariotomy, 463.
details of case of recovery and recurrence after five years, 463.
procedure when completion of ovariotomy is impossible, 464.

CHAPTER XV.

RECENT EXTENSIONS OF OVARIOTOMY.

castration not a practice of civilized life, 465.
Battey's proposal in 1872 made independently of any knowledge of Blundell's suggestion in 1823, 465.
a proceeding not in accordance with scientific principles, but expedient, object proposed by Battey, Hegar's extension of the suggestion, report of cases by Dr. Paul St. Mundé, 466.
my own experience confined to four cases, 466.

principle of Battey's operation limited in its application and liable to abuse, Hegar's suggestion less questionable, 467.
conditions justifying the operation of removal of the ovaries very rare, as shown by Battey's experience as well as my own, 467.
report of my first case in 1878, 468.
conclusions drawn from consideration of this case and subsequently confirmed, vaginal oöphorectomy exceptional, the abdominal section to be preferred, cautions as to the performance of both operations, 469.
operation not repeated for nearly four years; my second operation in 1881, 469.
protest against the frequency of this operation, Dr. Weir Mitchell's treatment of the cases often selected for it, Dr. Playfair's remarks, 470.
Dr. Barnes on hernia of the ovary justifying oöphorectomy, remarks by Mr. Hulke and Mr. Langton; numbers given by Agnew, 471.

CHAPTER XVI.

RESULTS OF OVARIOTOMY, AND SUBSEQUENT HISTORY OF PATIENTS WHO RECOVERED.

the principle of the operation justified by the results, 472.
mortality less than that after most capital operations, restoration to perfect health more frequent, 472.
fears that patients after ovariotomy would suffer some special inconveniences imaginary, 473.
correspondence with patients after ovariotomy, circular sent to all patients who had recovered after ovariotomy, 473.
summary of the answers returned, numbers of living and dead, cause of deaths since recovery after operation, number of children born of women married at time of operation, number of women single at time of operation and married since, 474.
number of children result of these marriages, 475.
case reported by Mr. Whitmarsh, of Hackney. 475.
condition after removal of both ovaries, peculiarities of a few cases, 475–476.
such an inquiry after a capital operation unique, 476.
health of patients generally restored, 476.
remaining ovary found to perform its functions naturally, 477.
recurrence of ovarian disease not common, 478.
proportion in my practice, 478.
first operation no bar to the performance of a second if necessary, 478.

CHAPTER XVII.

ON UTERINE TUMOURS.

the practice of ovariotomy has led to a better acquaintance with the prevalence of uterine tumours, 479.
many of the largest abdominal tumours are uterine, 479.

early errors of diagnosis, pedunculate uterine fibroids sometimes removed under the impression that ovariotomy had been done, 479.
physical signs often much the same in the two classes of tumours, 480.
history of the case seldom affords much information, 480.
age, uterine tumours perhaps more common in advanced life, and ovarian cysts among young people, 480.
physiognomy and complexion as aids in diagnosis, 481.
evidence from inspection, general enlargement, state of the umbilicus, condition of the superficial veins, movements of the tumour, appearances during change of posture, 481.
measurement and palpation, 482.
percussion and auscultation, 483.
vaginal and rectal examination, 484.
abnormal arterial impulse, simulation of aneurismal disease in some uterine cases, 484.
case by Dr. Bailey, of Louisville, K., 485.
change of position of the uterus, uterine sound, 485.
what may be learnt by rectal examination, 486.
effect of movement of the tumour upon the position of the uterus, 486.
ovarian and fibroid tumours of the uterus sometimes co-exist, 487.
case of fibroid tumours of the uterus impeding labour, 488.
case of fibroid outgrowths from the uterus removed by gastrotomy, report by Dr. Braxton Hicks, 490.
removal of fibro-cystic tumour of the uterus, with reports on the structure, by Drs. Ritchie and Gordon, 491–494.
nature of the tumours sometimes revealed by examination of the fluid obtained by tapping, 495.
opinions in 1863, 495.
result of ten years' experience, 496.
the subject introduced into the Hunterian Lectures at the College of Surgeons in 1878, 496.
case of operation in 1878, 497–498.
removal of solid fibroid tumour weighing 70 pounds, operation, report on tumour, and history of patient, 499–502.
modifications in operative procedure during the two following years, use of antiseptics, and union by suture of the peritoneal edges of the divided uterine wall, paper read at the Cambridge meeting of the British Medical Association, 1880, 502.
fibro-cystic tumour containing 13 pints of fluid, 503.
large pressure-forceps introduced for compressing the tissues at the base of a tumour, 504.
reports of several successful cases, 504–508.
exploratory incision in cases of uterine tumour, 509.
table of cases of removal of uterine tumours, 512–515.
table of cases of exploratory incision and partial removal of fibro-cystic tumours of the uterus, 516–517.

CHAPTER XVIII.

ON PARTIAL AMPUTATION AND ON COMPLETE EXCISION OF THE UTERUS.

the names of Blundell and Freund associated with excision of the entire uterus, 518.
that of Porro with partial amputation of the pregnant uterus, 518.
my case of complete excision of the pregnant uterus, not only the first of the kind in Great Britain but unique, 518.
details of the case, state of the patient, 519.
account of the operation, 519–20.
reports on the removed parts by Mr. Doran, 521–2.
after treatment and condition of the patient, 523.
suggestions for future operations, 524.
suggestions by Nunn and Müller as to dividing uterus before excision, 525.
drainage not necessary, 526.
combined vaginal and abdominal operation for removal of non-gravid uterus, 526–7.
amputation by the vaginal method, 527.
compression of aorta, 527.
forceps instead of ligatures, mode of controlling hæmorrhage, 527.
Blundell's operations fifty years ago, 527.
report of 94 cases of Freund's operation, collected by Olshausen, 1880, 528.
report of 44 cases of vaginal operation, 528.
case of excision by Bischoff, 528.
letter from Billroth with case of excision, 529.
practice in cases of gravid or non-gravid cancerous uterus, 529.
excision the only resource when the body or fundus of the uterus is affected, 530.

ERRATA.

Page 15, *line* 7 *from foot*, *for* Hugier *read* Huguier
Page 198, *line* 24, *for* membrane *read* membranes

LIST OF ILLUSTRATIONS

PAGE

Extra-ovarian cyst of broad ligament 14
Portion of a multiple ovarian cyst 20
Diagrammatic representation of an advanced proliferous cyst . . . 23
Mode of development of cysts from the epithelium 24
Tubular glands partially enclosed in stroma 28
Cysts and compound masses of glands imbedded in wall of parent cyst . 29
Secondary cysts projecting through the wall of a multilocular tumour . 30
Formation of secondary cysts by tubular processes given off from cysts in thicker portions of stroma 31
Vertical section through a cauliflower mass showing mode of formation of cysts 32
Cysts in fœtal ovary 34
Diagrammatic section of a dermoid and compound cyst 42
Clots in the corroded vessels of cyst wall 45
Section of the trabeculæ of a multilocular tumour 46
Dendritic growths on inner surface of cyst wall 53
Anæmic patches in wall of cyst 69
Physiognomy of patient with ovarian disease 82
Portrait showing compression of thorax by ovarian tumour . . . 83
Portrait showing distension of abdomen and expansion of the ribs . . 84
Portrait of patient with umbilical hernia 85
Situation of clear and dull sounds in typical cases of ascites and ovarian dropsy 88
Proliferating cells from abdominal fluids 98
Case of hysteric tympanites—abdomen distended 107
Same patient under chloroform—abdomen collapsed 108
Same patient, returning consciousness—abdomen inflating 109
Portrait of woman with peritoneal hydatid 116
Portrait of child with cancer of kidney 127
Position of cyst in case of renal disease 133
Retroverted gravid uterus with distended bladder 149
Mr. Charles Thompson's trocar; same trocar with syphon tube opened . 160
Syphon trocar, position of, in tapping 162
Wire for fixing canula in vaginal drainage 169

PAGE

Portrait of Dr. McDowell, of Kentucky 187
Clamp on pedicle 202
Parallel clamp 203
Original ovariotomy couch 206
Supposed ovarian tumour removed, 1815, by Dr. Emiliani, of Faenza . 240
Present arrangement of patient for ovariotomy 274
Nélaton's vulsellum 278
Division of pedicle by cautery 280
Pressure-forceps, small 283
Pressure-forceps, large 284
Direction of incision in abdominal wall 286
Diagram, layers divided in an incision through the linea alba . . . 288
Diagram, through one of the recti muscles 289
Diagram, along one of the lineæ semilunares 289
Position of scalpel in making abdominal incision 292
Hook for raising the peritoneum 293
Division of the peritoneum 294
Separation of adhesions 297
Introduction of the syphon trocar 298
Extraction of the cyst through the abdominal incision 299
Breaking up the interior of the cyst 300
Ligatures on pedicle, detached ligature from case reported by Mr. Bryant 318
Compression of the pedicle and vessels by needles, after Simpson . . 321
Supposed internal view of same 321
Closure of the clamp on the pedicle 324
Turning the screw of the clamp 324
Abdominal wound closed by sutures, the clamp in position . . . 325
The cicatrix three weeks after operation 421
Scanzoni's trocars 423
Case of drainage of the pelvis by vagina 423
Case of intestinal obstruction 427
Vertical section of pelvis and pelvic organs 429
Horizontal section, view of pelvic organs from above 430
Fibroid outgrowth from the uterus 489
Portrait of patient with uterine tumour 500
Gravid uterus removed by abdominal section, back view of preparation in college museum 521
Same, front view 522

OVARIAN AND UTERINE TUMOURS

INTRODUCTION

THE only phenomena connected with the human race which have remained unchanged from the beginning are those of reproduction. Form, colour, type, language, habitudes, character have all been subject to variations, as the influence of ages has been brought to bear upon succeeding generations. But such as the ovum was in the beginning, such it is now, and we may presume that whatever modifications other organs have undergone we see the ovary in its pristine form. Nor is this a matter to be wondered at. Essentially the central point to which the energy of universal life is directed is that of procreation. The aim is unique and the means are uniform. The primary cell of the being is the dominant cell, and on it depends the continuance of the species. All the composite structures evolved from it have reference through nutrition and mind force to its successors. In its turn the condition of this cell-nest affects the life and well-being of the race, and it is with its deviations from natural states that we have to do in ovarian pathology and surgery.

In proceeding to estimate the frequency and importance of the diseases of the ovaries, we have to consider the wonderful series of periodical processes which go on in women every month for some thirty-five years of life: sometimes without any interruption by pregnancy, sometimes interrupted by many pregnancies, either carried on to the full term or arrested at different stages; followed by lactation for periods variously prolonged, and perhaps suddenly stopped by the death of the child or by another pregnancy; attended by losses

of blood of less or greater quantity, and ceasing usually from forty-five to fifty-five years of age, after more or less irregularity. We have to remember that at each menstrual period one or other ovary becomes swollen; that one or more of its ovisacs enlarges, opens, and admits of the escape of the ovum it contained; that the fimbrial end of the Fallopian tube grasps the ovary, receives the ovum, and allows of its passage into the uterine cavity; that the uterus itself receives an increased supply of blood, and that its mucous membrane undergoes a series of exfoliative changes. We must consider further how these periodical processes are associated with much that is of supreme importance in the state of the nervous centres and in the mental condition of woman; that the normal process, instead of recurring at regular intervals and ceasing in a few days, may be abnormally prolonged, and may recur at most uncertain periods; and that evolution and involution may be both affected by pregnancy and lactation. When we bear in mind all these highly complex conditions, processes, and relations, the marvel is not that ovarian diseases should be so frequent, but that so many women pass through life without suffering from them.

The ovary is an organ which passes through a series of changes during the whole of female existence. Childhood and youth are taken up with its development, and it is then small, elongated, with a smooth unbroken surface, and moderate supply of blood. At puberty functional activity takes the place of growth, and there is greater turgescence, more rotundity of form, an often-repeated laceration and scarring of the outer coats, replacement of the natural contents of the ovisacs by the vestiges of the evolution, accompanied by a constant tendency to irregularity of function and to disease. After the period of active ovulation has passed, old age brings with it the usual retrograde action, and marks of atrophic decay. The gland is found small, pale, shrivelled, nodular, and seamed with scars. With this collapse of the organ, and consequent decline of fecundity, the distinguishing peculiarities of feminine character and configuration are gradually modified.

During the period of generative activity, the repeated clearing out of the Graafian follicles is followed by reparative action. The greater number of ova escape the seminal contact or influ-

ence. In this case the local exacerbation ceases, and no traces are left in the uterus of the abortive process, while rapid cicatrization of the collapsed follicle ensues in the now quiescent ovary.

The appearances which this cicatrization occasions are known as the *corpora lutea*. That which results from the exit of an ovum which does not become impregnated is less marked in its characteristics, and is said to be a false *corpus luteum*. Everything settles down quietly after the failure of conception: inordinate vascular action subsides in the ovary as in the other excited organs, and the emptied Graafian vesicle has simply to go through the process of healing. Blood is effused into the cavity of the sac at the time of rupture, coagulates, forms a clot, and is enclosed in the collapsing tunics of the follicle. The true ovisac, with its epithelial lining, isthrown into puckered folds by the greater contractility of the outer layer, some fibrous exudation takes place, and the clot is closely packed in the centre. Transverse section shows the reddish mass of blood enclosed in the corrugated folds of the yellow layer, from which the body derives its name; and this is surrounded by the whitish coat of the follicle in contact with the stroma of the ovary. But atrophic changes rapidly set in: the capillary vessels shrink, the mass of cells and their matrix membrane undergo fatty degeneration, and the clot disappears by absorption, so that before the recurrence of another period only a stellate cicatrix is to be found retracted in the substance of the ovary.

On the contrary, when conception and pregnancy follow the escape of the ovum, the ovary is involved with all the other associated organs in the state of nutrient energy, and although the new-formed corpus luteum is equally destined to obliteration, the event is delayed until some months after parturition. The morphological changes are for a time not decidedly retrograde. Active circulation goes on in the outer coats, and exfoliation of epithelial cells continues, so that the yellow convoluted layer thickens and encroaches on the central space, where the condensed clot becomes more or less organised. This state of abnormal nutritive effort attains its highest point about the fourth month of pregnancy. But though some small portion of young fibrous and connective tissues may be formed in

connection with the coats of the ovisac, and thus render the substance of the corpus luteum more compact and organised for a time, yet no true progressive structural development takes place. No new histological elements have presented themselves, and no new combinations of the tissues have resulted, so that all the apparent growth consists in the temporary hyperæmia of the original coats of the follicle, the elimination of a small quantity of embryonic structures from them, the accretion of epithelial cells and fatty matter, and the partial metamorphosis of the central clot into a tissue of the lowest form of vitality—a sort of pseudo lining membrane for the cavity caused by its conversion. From this point nothing very different from the atrophic degeneration of the corpus luteum of menstruation happens; but the stages of retrogression are slow and prolonged to the end of pregnancy or through the two or three earlier months of lactation, the variation evidently depending upon the amount of conservative nutrient energy directed to the part. It may be understood from this physiological explanation of the origin and end of corpora lutea how these two successive conditions of imperfect nutritive effort and atrophic decay may, if misdirected or carried to excess, give rise to various forms of disease, either of hypertrophic growth or malignant degeneration.

Absence of the ovaries, or their imperfect development, may occasionally be inferred from some physical peculiarities or physiological aberrations; and the presence of a third or accessory ovary, now and then observed in the dissecting-room and on the operating table, may probably account for the recurrence of regular menstruation in spite of serious disease or after the removal of two by ovariotomy.

The congenital or accidental displacements of the ovaries are from time to time the cause of perplexity to the surgeon, and the manipulation in the necessary examination requires skill and care. The ovaries may be felt in their normal position on either side of the uterus, a little below the brim of the pelvis, between one finger passed upwards in the vagina and another pressed downwards from the abdominal wall. It is only in some exceptional cases of firm vagina or very tense and thick abdominal wall that the ovaries cannot be made out.

In order that this examination may be done effectually the

patient should be made to lie on her back, with the shoulders and knees raised so as to relax the belly, and both bladder and rectum must be empty. It is only by combined internal and external examinations that a normal ovary or one only slightly enlarged can be detected. External examination alone is quite fruitless. By vaginal examination alone a resisting body may perhaps be felt through the upper part of the vault of the vagina: its mobility may be recognized, but nothing more. Indeed in most cases the ovaries are so easily displaced that they elude internal examination alone. Yet two fingers brought together, one from without and one from within, may fix and feel the ovary between them. It is well first to find the fundus uteri and to steady it by one or two fingers, and then by the combined examination the ovary is found near the uterus, on one side of it. The finger can be passed around it and it may be shifted easily from before backwards, and less easily towards and away from the side of the uterus. It has a firm elastic feel, glides easily under the fingers, and the unevenness of the surface may often be clearly detected.

A small hard mass of fæces in the bowel, a swollen pelvic gland, a cyst in the broad ligament, a dilatation of the Fallopian tube, or a small pedunculate outgrowth from the uterus might give a similar impression to the examining fingers, but after some practice this will not be mistaken for the characteristic feel of the ovary.

The right ovary is most easily reached by one or two fingers of the right hand in the vagina, the left hand being on the abdomen; the left ovary by the left hand being used for the vagina and the right for the outside.

Examination by the rectum is in some cases more, in others less useful than by the vagina. Occasionally, when the rectum is large and the vagina tense, one or both ovaries may be distinctly felt by the rectum and not by the vagina. In some cases, when the ovaries can be readily felt by the vagina they cannot be touched by the rectum. Even in the case where the ovary is abnormally situated in Douglas's space it may be palpable through the posterior wall of the vagina, and the fingers of the hand compressing the abdomen meet a finger in the vagina much more readily than one in the rectum. Examination both by rectum and vagina is necessary when an

ovary, not enlarged, is supposed to be in Douglas's space, for Schultze has known a gland behind the rectum to be felt through the vagina and mistaken for an ovary.

It must be remembered in judging of the size of an ovary, that if small, and felt through a thick abdominal wall, it will appear to be larger than it is, and that ovaries of the same size felt through walls of different thickness may appear to be of different sizes. A little practice will be sufficient to teach what allowance should be made in face of this source of possible error.

A healthy ovary is generally insensible to moderate pressure. But touch may give pain when there is no reason to suspect inflammation or any other departure from a state of health. Even ovaries greatly enlarged by inflammation will bear considerable pressure—a proof that Oophoritis does not necessarily extend to the peritoneum; for when this membrane becomes implicated the sensibility to pressure is generally extreme. The diagnosis can only be made out with certainty when the swollen and painful ovary is distinctly felt as a circumscribed lump.

Schultze says he has often observed that the displacement of the ovary during inflammation may rather be into Douglas's space than to the front of the uterus, and that on regaining its usual volume and sensibility it has returned to its natural position. In other cases after recovery it remains fixed; and once an ovary which had been closely adherent to the uterus after inflammation was several months before it became again movable.

The displacements of the ovary recognized by this mode of double examination are all within the limits of the abdominal cavity; but, like portions of omentum or intestine, the whole gland will sometimes find its way through the weak points of the parietes, and we have to deal with it as a form of hernia, either inguinal, crural, ischiatic, umbilical, ventral, or vaginal. Pott's case was one of simple hernia and abscission; but an ovarian cyst has even formed outside the inguinal ring, and been the subject of an extra-mural ovariotomy by a Spanish surgeon. An instance of this kind has not come under my notice, but I do not see that it can offer any special difficulties to the operator.

There is much truth in the remark of Arthur Farre that 'of all the organs of the body the ovary is perhaps that whose pathological conditions have been regarded with the smallest amount of reference to its natural deranged functions;' and it is not unusual to hear ovarian hyperæmia and inflammations, either acute or chronic, spoken of as more or less connected or dependent on some metritic action. This appears to me, however, to be as illogical as it is unwarranted by fact. Of the whole series of the generative organs, the ovary is indisputably the first, the most influential, and in fact the *raison d'être* of all the rest. Calling it a gland, for want of a better term, as the nidus of ovulation the tubes, uterus, and vagina are but accessories to the completion of its functions in the impregnation, incubation, and expulsion of its product. The various states of hyperæmia and inflammation, when not traumatic, are mostly to be traced to some functional perversion, and probably are more often transmitted than imparted. As the most conspicuous member of the series, and unfortunately the most accessible, the uterus has attracted the attention and experienced the meddlesomeness of gynæcological science, and has had to bear the blame of many unmerited pathological accusations. But in ovarian disease it is the ovary which is ordinarily from first to last in fault, and to it we should direct our care and remedies. The symptoms and general effects of these hyperæmic and inflammatory conditions of the ovary are terrible and disastrous enough; but their special interest here is that they may be regarded as too often the point of departure in the formation of cystic and other tumours.

CHAPTER I

THE DIFFERENT KINDS OF OVARIAN TUMOURS

Abdominal and pelvic tumours connected with the female organs of generation are of many kinds, but those which especially implicate the ovary may be reduced to three classes: 1st, the adenoid tumours, composed of gland structure in variously altered conditions; 2nd, tumours of a fibrous character, the result of growth from the connective tissue of the organ; and 3rd, those tumours which assume a malignant form, and are essentially degenerations or new formations. Other cystic tumours are found in the neighbouring organs, sometimes complicating the diagnosis of ovarian tumours, and requiring nearly the same management and operative measures. To show their analogies and relations, all of these may be grouped in the following manner:—

OVARIAN TUMOURS.

1. *Adenoid*:—*a*. Hypertrophy of part or whole of the gland.
   b. Simple cysts—enlarged Graafian follicles.
   c. Multiple cysts—cysts in apposition forming multilocular tumours.
   d. Proliferous cysts—parent cysts with secondary cysts growing from the interior of cyst wall.
2. *Fibrous*—Growth of stroma of ovary.
3. *Malignant and tubercular*—Cancer, tubercle.

EXTRA-OVARIAN TUMOURS.

Cysts of Fallopian tube and terminal vesicle.
Cysts of broad ligament or vesicles of Wolffian body.

Cysts developed from tubules of parovarium.

Cysts developed in the subperitoneal tissue of the pelvis or abdomen.

Cysts developed from aberrant ova attached to the peritoneal surface.

But for descriptive purposes it will be better to arrange the simple cysts in two classes :—

1. *Ovarian*—Enlarged Graafian follicles.
2. *Extra-ovarian*—*a*. Cysts of Wolffian body.
   b. Cysts of Broad Ligament.
   c. Cysts of Fallopian tubes.
   d. Cysts developed in the subperitoneal tissue of the pelvis or abdomen.
   e. Cysts developed from aberrant ova.

The compound adenoid tumours also fall into two divisions :

1. *Multiple*, consisting of cysts aggregated together.
2. *Proliferous*, or parent cysts, filled with cysts of secondary growth :—

leaving for after consideration the tumours arising from fibrous and malignant growths.

SIMPLE OVARIAN CYSTS.

The simple or unilocular ovarian cysts are organised sacs, containing fluid, which grow from some part of the ovary itself. They commence their growth as small vesicles, but no limit can be mentioned as to their ultimate size, except that of the containing power of the abdomen, and the extent to which the abdominal walls may be distended. As they enlarge and press upon the viscera in contact, enough irritation is generally set up to lead to the formation of bands and layers of attaching tissue. Often, however, so little local disturbance attends the increase of the tumours that they reach the size of the gravid uterus without any adhesions.

The walls of even these enormous sacs are, after all, in their simple forms, only the continued growths of some of the original ovarian tissues. No new elements are superadded. There is only a surplus of material, malarranged and out of place. At their first stage of development into cysts, they are to be seen with one part projecting from the surface of the ovary,

the remainder being imbedded in its stroma, or enveloped by its fibrous tunic. The coats are then thin, membranous, and translucent, and not in any way to be distinguished from the natural structure of a Graafian follicle. With growth comes greater thickness, opacity, and firmness. The delicate membrane of the vesicle has changed into a layer of fibrous tissue, with its full complement of nerves, arteries, and veins; the epithelial lining is more marked from abnormal reproductive activity in the cells, and an ultimate tendency to irregular formations; and the peritoneum remains always recognizable as the outer investment. The peritoneum is extremely attenuated, and cannot easily be detached, but retains its delicate pavement epithelium. The interior has also sometimes the smooth glistening appearance of a serous membrane with similar epithelium, interspersed here and there with groups of a few stalked and ciliated cells. Naturally the most distant unattached points of the sac are the most yielding, and become thinner than the other parts. There is no uniformity of thickness, which in different cases, or even in the same tumour, may vary from more than an inch to the extreme bursting point of tenuity. The histological elements of this coat are identical with those of ordinary fibrous tissue, consisting of fibres very difficult to disentangle, nucleated fibre cells and granules. The form of the tumour, of course, mainly depends on the elasticity of this layer, and when freed from pressure assumes nearly that of a globe or egg, with bulgings irregular according to the density or yielding disposition of the several parts. Though as a rule receiving an abundant supply of blood for nutrition and growth, the inevitable stretching and pressure from the accumulation of fluid, and consequent interference with capillary circulation, give this tissue a proneness to structural degeneration, and it may become softened by fatty transformation or indurated by earthy deposit. The vessels which supply it enter at the base, enlarge with its growth, and ramify very freely on its inner surface. They form a complex network in and under the peritoneum, and the capillaries passing into the fibrous layer traverse it, and have a peculiar arrangement on the inside, where they form knots of anastomosis with bulbous dilatations and terminal pouches, like but less regular than those found in the chorion. According to Harris and Doran they sometimes are

the origin of large cysts. They undergo many changes, and are often atrophied and completely obliterated, and replaced by successive fresh formations. The consequence of this is, that there are incessant irregularities in the circulation, with stagnation and capillary embolism. The decomposed blood yields a deposit of granular hæmatoid matter and cholesterine, of a yellow colour, which tinges the tissue and gives it a brownish or tawny appearance on section. Outside, under the peritoneal covering, the course of numerous large and tortuous veins is to be traced plainly, and they often acquire considerable volume. Nerves, sometimes of great size, pass with the vessels into the substance of the coats, but their mode of termination has not been made out. The lymphatics, also, are in some cases developed much beyond their ordinary volume. Generally the Fallopian tube, enlarged and elongated, stretches over the surface of the tumour and sometimes seems almost identified with its substance, the fimbriated extremities being spread out and more or less attached. In other instances the overgrown tube passes freely along the walls of the cyst in a fold of peritoneum. However placed, it mostly shows an increase of growth corresponding with that of the ovary.

Many of the simple ovarian cysts originate in a Graafian follicle, either before or after its rupture. The theory that the whole energy of the developmental process in the follicle is confined to the delicate germinal vesicle, and that the first impulse to the formation of a morbid cyst is caused by the destruction of the germinal spot, and the involution of the Graafian follicle, does not furnish a sufficient explanation of every case. Rokitansky and Ritchie found the ovum in ovarian cysts larger than an ordinary mature Graafian follicle, which proves that the vesicle need not become obsolete in order to degenerate into a cyst; and simple cysts of corresponding character are sometimes met with in the ovaries of new-born female children. The mere presence of an ovum, however, is no convincing proof that a follicle has not become obsolete. But without excluding this as one cause of the formation of ovarian cysts, others must also be sought for among the changing conditions of the organ. Probably, accidental hæmorrhage into a follicle approaching maturity and in its most active stage of formative power may tend to morbid enlargement.

Rokitansky has demonstrated that cysts may be developed from a corpus luteum, or from a ruptured follicle of which the involution has been arrested. His description of such cysts is in these words:—'The cyst is always lined with a stratum thicker than the wall of the follicle itself, which adheres to it either very loosely by a delicate areolar tissue, or very intimately by a dense connective tissue. This lining stratum is of a dirty white colour, and has a rough inner surface. It may be recognised as the yellow layer of the corpus luteum which has been rendered thinner by expansion, and the roughness of its inner surface is occasioned by some of its remaining folds.' The liquefaction of the fibrinous clot in the corpus luteum may also give rise to a cavity, which will be found covered with secreting cells, and may afterwards enlarge so as to have a cystic form.

If hyperæmia is to be taken into account as operative in the production of cystic degeneration, it must not be forgotten that this condition also occurs in the normal physiological enlargement of the follicle and its final rupture. Scanzoni's explanation appears well founded, when he points out that a thickening of the cell walls must necessarily take place previously, if the rupture which usually follows hyperæmia is to be prevented, and the follicle degenerate into a cyst. A more considerable thickness of that follicular wall is, according to Scanzoni's view, either a peculiar malformation of the ovarian tissue, or the sequel of hyperæmia which has caused abnormal deposition of the lining membrane of the follicle. Julius Klob frequently examined simple cysts of the ovaries in new-born children and young girls, of which he gives the following account. In these ovaries there are either cysts with homogeneous, serous, fluid contents, or the so-called hæmorrhagic cysts—that is, follicles expanded to thin walled cysts from extravasation of blood. Schultze found the ovarian stroma in a child born in breech presentation degenerated to an extensive network, completely filled with blood, both fluid and coagulated, and so forming a simple cyst. In two cases mentioned by Klob, the capillary vessels of the follicle were atrophied, leaving in the one case on the inner surface a delicate tracery, the remains of the obliterated vessels, and in the other stains of a dark red or blackish colour from the de-

composing blood. Grohe advances an explanation of the phenomena. He maintains that there are two vascular systems in the ovary, independent of each other; one set being the nutritive vessels of the organ, the other merely subservient to the growth of the follicles, and ceasing to exist as they ripen and burst.

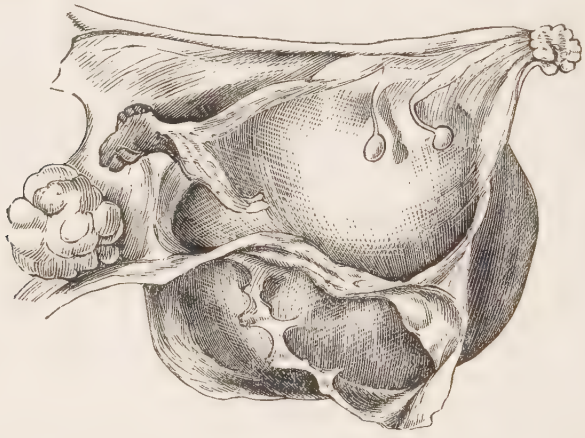
If this be true, it may be seen how under certain conditions this functional, exclusively follicular, set of vessels may become obliterated after having reached a given point of development, the generative life of the follicle may cease, and its tissues fall under the influence of the simple nutritive action of the part, which, by thickening the walls and increasing the quantity of secreted fluid inside, at once converts the follicle into a cyst. Occasionally, too, Graafian follicles are so deeply seated in the structure of the ovary, that though the ovum is fully formed and ready for impregnation, there is no possibility of its escape by rupture; and its unwonted presence in such a position may give rise to morbid action. With great local congestion there is also the possibility of intra-follicular hæmorrhage, and cysts are found in adult ovaries distended in this way to a considerable size. The same thing on a smaller scale has happened in children and the fœtus, and so given the conditions for cyst formation. Besides this, the localized inflammation of a single isolated follicle may be the cause of cystic degeneration. The true ovisac can often be turned out from the external coat of the follicle, but a cyst once formed is not to be separated from its attachments without dissection.

SIMPLE EXTRA-OVARIAN CYSTS.

The annexed drawing, from a specimen in my possession, which I removed from a patient who had a large cyst of the opposite ovary, shows remarkably well the character of these extra-ovarian cysts, or cysts of the broad ligament.

The simple extra-ovarian tumours found upon the broad ligament are commonly either cysts arising from the tubules of the parovarium, or expansions of the terminal bulbs of the Wolffian organ. These vesicular bodies, which are seen pendent near the fimbriated end of the Fallopian tube, or from the spreading part of the broad ligament, sometimes fill with fluid

till they reach the size of a nut or an egg. They are described in reports of post-mortem examinations, made for other purposes, as having thin walls covered with peritoneum, no adhesions, clear contents, and small canular pedicles. The thinness of the walls and the slenderness of the pedicle will account for their often bursting or falling off before giving any symptomatic trouble. But the dilatations of the tubules of the parovarium which have led to the use of the term dropsy of the broad ligament, and which end in the development of true cysts, are not at first so strictly pedunculated, and have an internal lining of pale cylindrical nucleated epithelium, corresponding with that found naturally in the tubules. They cause comparatively



little constitutional disturbance, and are not rapid in their early enlargement. But by accidental production of fibrous tissue in the coats of the sac, the chances of bursting are diminished, and they occasionally grow to a large size ; in fact, some of the very voluminous cysts on record were found to arise from some part of the broad ligament.

The following is an illustrative case: A lady, aged twenty, had observed an increase of size as far back as 1862, but continued quite well till three months before I saw her in August 1863, when the existence of an ovarian tumour had been suspected only for a few weeks. The girth at the umbilical level was thirty-four and a half inches, the distance from the ensiform cartilage to the pubic symphisis fifteen inches, and from the

ilium to the umbilicus on the right side nine inches; on the left, eight. The abdomen was occupied with a fluctuating tumour, which extended upwards two or three inches above the umbilicus. There was no crepitus, and no tenderness on pressure. The uterus was far backwards, a little to the left, and freely movable; the right side of the vagina was depressed, giving rise to the impression that the connection was with the right side of the uterus and rather close. The disease gave so little uneasiness, that all interference was postponed till March 1864, when the increase had been rapid, from seventeen to nineteen inches across the front of the abdomen, while the vertical measurement still remained fifteen inches. The cyst was then removed and the adjacent ovary along with it, as it felt hard and appeared larger and more corrugated than is usual in unmarried women; though, from its being quite apart from the tumour, it would have been easy to remove the cyst and leave the ovary. The pedicle was not thicker than a finger. Another cyst the size of a walnut in the left broad ligament near the ovary was laid open and emptied. Dr. W. Fox, after examination of the cyst, reported it as 'when distended about twice the size of an adult head. The Fallopian tube flattened out is seen to course along its external surface. The fimbriæ are, however, non-adherent and distinct. The ovary is found in a fold of the broad ligament, distinct from the tumour, and presenting the natural appearance. It contains no cysts. The cyst itself has a smooth external wall. It is lined internally by a flattened polygonal epithelium. No villous or papillary growths can be discovered on its inner surface. This was of a delicate rose colour. The cyst was injected with carmine, but the arrangement of its vessels presented nothing remarkable. The vascularity of the cyst was not very great. No other cysts could be found in the broad ligament.'

There is another form of extra-ovarian simple cyst, described by Hugier under the title of 'serous cysts on the exterior of the uterus.' The seat of their development appears to be the tissue connecting the peritoneum to the uterus, and for the most part they are found on the back of that organ. They sometimes grow as large as an orange, but are commonly of insignificant size. The attachment to the uterus is broad compared with the bulk, but in some cases the cyst elongating

acquires a distinct pedicle, and being freely mobile, may easily be mistaken for a similar cyst arising from the broad ligament or ovary. They have no specific characters indicating their mode of origin, and are not known to have occasioned more than mechanical inconvenience. Extra-peritoneal cysts have since been observed by other writers in England and Germany. They have been found in the lumbar region and other parts of the abdomen, and no doubt many of the non-pedunculated tumours which have been removed by enucleation or proved to have such widespread attachments as to resist complete excision and necessitate treatment by drainage have been cysts of this kind. The important practical considerations which this form of growth gives rise to, and which ten years ago we had not reasoned out, will be taken up when I come to treat of operative proceedings and the results of incomplete operations.

The fact that ova discharged from the follicle sometimes never reach the uterine end of the Fallopian tube, or, missing it altogether, become aberrant, and attach themselves to some point of the mucous or peritoneal surface, where they undergo changes, acquire vascularity, and reach a certain size before they finally submit to extinction, leads to the supposition that in particular cases the irregular development may be prolonged, and there being no generative impulse, all the nutritive energy may concentrate on the formation of tissue sufficient for cell walls and the exudation of fluid. Boinet writes thus: 'Maintenant, nous appuyant sur tous ces faits, sur les phénomènes physiologiques de l'ovulation et de la fécondation, ne peut-on pas admettre qu'il se passe, pour la formation des kystes de l'ovaire, ce qui se passe pour les vésicules fécondées? celles-ci se développent quelquefois dans l'ovaire lui-même, ou dans la trompe de Fallope, ou dans la péritoine, ce qui constitue des grossesses anormales. Eh bien, ne peut-il pas arriver que l'ovule non fécondé, mais devenu malade par suite de toutes les causes que nous venons d'énumérer plus haut, puisse se développer pathologiquement soit dans l'ovaire où il reste fixé, soit dans la trompe de Fallope où il s'est introduit, comme au moment de la fécondation, soit enfin dans la péritoine, où il est tombé?' Ritchie also made the same suggestion in his book on ovarian pathology, and was supported by the observations of others on the lower animals.

TUBO-OVARIAN CYSTS.

The tubo-ovarian cysts have an interest peculiar to themselves. They were first described by Ad. Richard and Labbé as Kystes tubo-ovariennes. The case reported by Blasius in 1834 as Hydrops Ovariorum proflusus belongs to the same class. Rokitansky and Klob found in several instances the distended end of the Fallopian tube connected with and opening into a cavity within the ovary. The walls of the cysts therefore were formed jointly by the tubes and the ovarian stroma. The ovarian portion of the cyst walls possessed either reticulated or smooth, yellow, yellowish red, or russet coloured lining membrane which did not continue into the tubal part of the cyst. The distal third only of the tube was dilated, and the middle third hardly ever showed in the formation of the cyst. Richard only observed the middle third to be implicated, in which case the fluid of the sac passed freely into the uterine cavity. But in the case mentioned by Blasius there were nearly similar conditions. The junction of the tubal end with the rest of the cyst is marked by a slight constriction, or is sometimes indistinct. In one case Rokitansky found the cyst wall at that part partially thinner, as if about to sever.

The genesis of such cysts is explicable. The pigmented portion of the cyst wall represents the yellow layer of a corpus luteum. The fimbriated extremity of the Fallopian tube had been embracing that portion of the ovary where the rupture of a ripe Graafian follicle was imminent, during a catamenial period. Instead of retracting, the fimbriæ remained adherent to the ovary, excessive secretion of fluid followed, and a cyst was formed. It is curious that in such cases the dilatation takes place most rapidly in the ovarian portion of the cyst, though it might have been expected that the tubal walls would have yielded more readily to the pressure of the fluid. The rupture of an ovarian cyst previously formed in a corpus luteum is a very probable occurrence. Richard has observed two such cases, and Boinet has published an account of the case of a young married lady, which he explained as the formation of a tubo-ovarian cyst by the bursting of a Graafian follicle into the adherent tube.

Some years ago I saw a lady in consultation with Mr. Arthur, of the Commercial Road. She had a large cyst in the abdomen, which we believed to be ovarian, and I went one day prepared to tap her, when I found that discharge of serum had suddenly come on from the vagina some hours before, and was still continuing, while the abdomen was manifestly diminishing in size. The fluid had very much the character of the liquor amnii, and, on introducing a speculum, Mr. Arthur and I both saw it very distinctly coming out of the os uteri, and along the speculum. The discharge continued for several days, the abdomen regained its natural size, the lady recovered good health, and there has been no reappearance of the cyst, which was assuredly one made up by the union of the tube with an ovarian cavity.

A case which occurred in the practice of Mr. Anderson, of York Place, furnished ocular demonstration of this tubo-ovarian form of tumour. A woman with symptoms so urgent as to require tapping sent, on the day fixed for the operation, to say that she was passing such a quantity of urine that all her distress had vanished. At the visit it was found that the discharge still continued. It proved to be, as Mr. Anderson writes, 'simply highly albumenised serum, with cholesterine plates. The case went on, the woman's size lessening till she gained flesh again. After some six months she died from a sudden outburst of hæmoptysis. On post-mortem examination, a large empty cyst, with thick walls, and including some lesser cysts, was found lying collapsed and loose in the belly. The cyst on being slit open, where the escape had taken place, became immediately obvious, and a good-sized staff (No. 10 or 11) passed with the greatest facility along one of the Fallopian tubes into the uterus and vagina. The parts were sent to the College of Surgeons, and now lie hidden and undiscoverable among the mass of accumulated specimens.'

The following case of tubo-ovarian cysts recorded by Dr. L. Beale in the 'Pathological Transactions' for 1867–8 is curious: The patient, a married woman, aged thirty, died under Dr. Beale's care in King's College Hospital of chronic renal disease. For the last year of her life she had not menstruated; there was no history of any uterine affection; and she had never been pregnant. After death two tumours were found in the pelvis, one

on each side of the uterus; the left one was circular, about the size of a small orange, and distended with fluid; on its upper and inner surface was seen a tortuous but not uniformly dilated canal, which was closed at the uterine end, but opened freely into the larger cyst at its ovarian extremity; this was the uterine portion of the Fallopian tube, while the cyst was the dilated fimbriated extremity. The tumour on the right side was smaller, and the inner portion of the tube was uniformly dilated into a canal, one-third of an inch in diameter; like the one on the other side, it communicated with the cyst by a smooth circular opening.

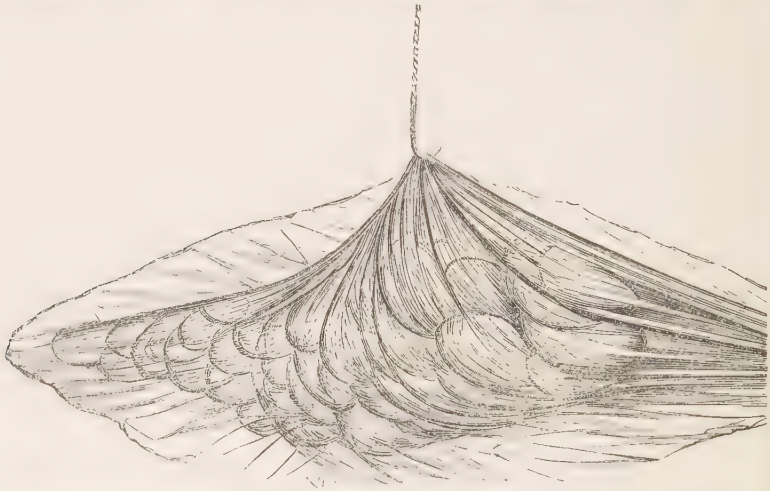
On each side the inner constriction was just outside the uterus, where the tubes seemed to be merely fibrous cords; externally the fimbriated extremites were also closed and dilated into roundish cysts. Each cyst had thin walls with fluid contents of a dark-brown colour. The left ovary could not be seen; the right ovary was flattened out and lying in the wall of the cyst, but not communicating with it. No traces of ovarian structure were left, but a mere cyst with semifluid contents of a chocolate colour.

The uterus was quite normal in appearance; but no distinct opening could be seen at the fundus, where the tubes generally enter; outside, the peritoneal surface was normal, nor were there any adhesions showing previous inflammation.

MULTIPLE OVARIAN CYSTS.

Every tissue and organ, however healthy, has a propensity, under given stimulation, to an abnormal reproduction of itself. There are tumours of every form of tissue, modified by the various conditions of nutrition; and outgrowths of compound gland structure are equally common productions. The ovary, instead of being an exception to the rule, is perhaps one of the greatest transgressors in this respect. Some physiological perversion occurs in the natural career of a Graafian follicle; it fails in the evolution of an ovum, but it succeeds as a monster cell-growth, and becomes a simple unilocular ovarian cyst, the simplest form of adenoid tumour. Two or more Graafian follicles do the same thing simultaneously; they abort, grow side by side, fill with fluid, become an

enormous assemblage of similar units, disfiguring and stimulating each other by pressure and reflex action, forming preternatural adhesions within and without, and at length, by their very excess of development, inducing in their component tissues the inevitable process of involution, and in the organized being to which they belong a lingering decay and death. In this is recognizable an adenoid tumour of the true type and tendency, aggressive and destructive, though not essentially malignant. Gaining a certain size, however, it generally happens that one out of the many dropsical follicles takes the lead of the rest. Annihilating some of its neighbours, it dwarfs others, lessens their vitality, vitiates their contents, and fills



more rapidly than they. And this struggle for existence seldom goes on long without destroying their integrity; pressure and expansion cause obstruction to the circulation in the cell walls. Atrophy and absorption are the natural consequences, and the boundaries being wholly or partially gone, or represented only by bands or bridges of membrane, the adjacent cells communicate, and the tumour assumes what is called the multilocular form. This process of excavation may even go further, till all the cavities become continuous, or, with a total clearance of every partition, the cyst remains only one-chambered. The tumour here represented was peculiar in that the trabeculæ were very fine, and the vesicles they enclosed for the most part

retained their globular or oval form, had clear contents, and were translucent. The case was reported by Dr. Ritchie, and, as he expressed it, the tumour 'might be looked upon as a normal ovary dissected by hydrotomy.' These transformations cannot be called capricious, but they are unaccountable, since they are found taking place at an early period in some small tumours, while others of large size preserve their multiple vesicular character intact. The elementary tissues of these composite cell walls are much the same as those constituting the unilocular cysts, but the nature of the contents of the several loculi varies almost indefinitely. Liquidity, consistence, colour, and chemical composition may be different throughout. One cell may contain nearly solid matter; the next a limpid fluid; in one may be pus, in another serum without any trace of cell formation; there is union in the mass, but no uniformity of action in the parts, and the growth having overstepped the bounds of healthy influences comes to ultimate destruction by the irregular play of a series of morbid changes.

Undoubtedly, too, there are cysts formed in the ovary as in other organs, quite independently of the advanced Graafian follicles. Bursæ are soon produced under the skin by mere friction; and the accidental presence of any foreign body such as crystallised matter or exuded fluid in a tissue, or the stimulation of some immaterial irritant, may cause the formation of cyst walls. And, once organised, they are capable of rapid augmentation of volume or multiplication. There are often discovered, in examinations of the ovary, cysts which bear no relation to Graafian follicles or corpora lutea, but which seem to have originated in the deep areolar tissue, or among the vessels of the gland. They may have commenced as tiny deposits of fluid in some one of the areolar spaces, about which condensation of the surrounding tissue would soon take place, with the speedy production of a limiting capsular membrane, channelled out with capillary vessels; or it is allowable to retreat a step further for explanation, and fall back upon the easily roused innate power of evolution of the plastic nuclei and cells of the tissue.

Leopold of Leipsic has a paper in the number for August, 1881, of Virchow's 'Archives,' on the transplantation of embryonic tissues, in which he relates experiments proving that

the result is sometimes that of a growth which may fairly be called a tumour. But all that he has done and recorded fails to support the hypothesis recently put forward by Cohnheim, that all tumours, ovarian as well as others, owe their being to the persistence in various organs and parts of the body of small residues of embryonic tissue. There is a great difference between a visible graft which you have yourself cut from a fœtus, or a wandering ovum which you can trace, and an invisible residue of tissue which has never been demonstrated—that is, between a fact and a possibility; and, as it appears to me, the presence of embryonic tissues in tumours, when we look at the conditions in which they exist, goes to show not so much the point of origin as the degenerative tendency and lethal destiny of such growths.

PROLIFEROUS CYSTS.

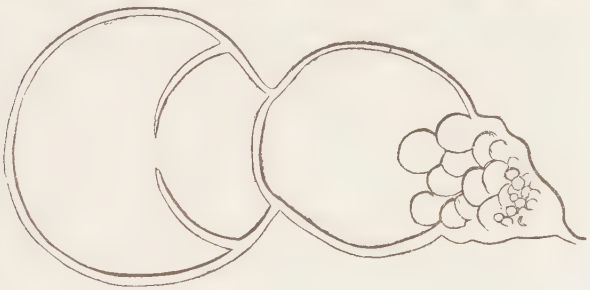
An ovarian adenoid proliferous tumour is a parent cyst filled with its progeny of endogenous cysts, or surrounded by others of exogenous growth. It may have the same origin as other cysts, and its early condition would be that of a common unilocular cyst. In fact, any epitheliated cysts may become proliferous, and they are found in all parts of the body. But wherever they are, they have, when filled up, the same complex appearance to a casual observer and seem equally to defy description or comprehension. When cut open, the interior is seen to be choked up with other cysts, growing from all sides, crowding and pressing each other out of shape. From the outside of these secondary cysts others grow, and the same outgrowth may be again repeated upon them. So, too, if these inner cysts are opened, another endogenous series may be disclosed within, and the budding does not necessarily stop there.

Want of space and failing vitality only, either in the patient or the part, put an end to the process. A through section gives to view a space circumscribed by the cyst wall, irregularly areolated, with the membranous septa impinging upon each other at every conceivable angle, and pourtraying the outlines of the interspaces and loculi. The thickness of the walls generally keeps pace with the growth of the cysts, the little ones looking only like distended bladders; but a small

additional growth yields fibrous tissue, with vessels entering the pedicle and ramifying everywhere. The internal surface has epithelium, and often looks flocculent when the layer is not very fine.

But proliferous cysts have degrees of fertility. Some breed to suicidal repletion; others fill with fluid and nourish a few clusters, or only a single symmetrical cluster of secondary cells, which have room enough and to spare, and hang pendent in the cavity. Now and then only one solitary bud indicates the self-multiplying tendency of the parent cyst.

It is in these simple cases that the mode of development can be studied, and here is revealed the clue to the problem. The Graafian follicle is a proliferous cell. It is lined with epithelium. In course of time, one of these cells, a sort of queen cell, probably the developed nucleus of the cell originally



formed in the *couche ovigène*, makes a fresh start in life, increases in size, fills out to roundness, and feeds its own nucleus till it becomes conspicuous as the germinal vesicle. This again reproduces its like within itself, the germinal spot, another cell. At this point this triply involved cell awaits the spermatic influence to deviate into a new career and to commence the generation of a new set of cells by division, endowed with the novel formative properties necessary for the building up of tissues the same as those of the being from which it sprang. But this fecundating influence not arriving, it falls the prey of involution, softens, dwindles away, and melts down out of sight among the rest of the ejecta. This is what happens in the healthy Graafian follicle. But suppose the Graafian follicle is injured, or some morbific influence taints it, and the ovum is blasted, the vesicle then takes on a cystic form and enlarges.

It is still lined with epithelium, and that shares with the rest of the structure the evil impression. Some individual cells distinguish themselves by eccentric shapings; they elongate, form a pedicle, and show their nuclei. After a time they throw out a pouch-like projection, which lengthens, grows as it were on a stem, and is nucleated too. Groups of cells sometimes act together in the same way. Or it may be that a cell becomes columnar, or ramifies, and assumes dendritic forms, budding after a like fashion. In the case of their

having plenty of space and abundant nutriment, they elaborate a fibrous coat with capillary vessels, push on symmetrically, and hang into the cavity like a close set bunch of currants.

Intensify the growing power sufficiently, and a proliferous cyst is soon filled with progeny, and presents the complicated aspect first described. But, as all these secondary growths throw out successive generations of epithelium on both their surfaces equally with the parent cyst walls, the cells lying upon them are liable to, and do undergo the same changes and develop-

ments as the cysts they crop out of. Two modes of the increase of the tumour are thus evident—the reproduction of new cells with cystic tendencies, and repeated gemmation from the newly formed cells and cysts.

Yet another complication of these proliferous cysts presents itself. Some parts of the cell walls have in them the same plastic elements which form the *couche ovigène* of Sappey, and these may be roused into activity. They grow, and grow as they were designed to grow, into Graafian follicles, containing ova. The demonstration of this, as a fact, was first made by Rokitansky, who published his discovery in the year 1855 in the 'Wochenblatt der Zeitschrift der KK. Gesellschaft der Aerzte zu Wien,' where he describes the appearances observed in a woman, twenty-six years of age, who died of diseased ovaries. Both ovaries were affected. The tumour on the right side was as large as a child's head, that on the left as large as a man's fist. Both ovaries were composed of a number of cysts as large as a cherry, which, for the most part, lay closely packed together, here and there became flattened by mutual compression, and occasionally were projected into each other. The surface of the tumours was thus slightly lobulated, and between the protuberances were seen, at intervals, cysts as large as a barley-corn, a pea, or a bean. These latter cysts on being punctured gave exit to a greenish-coloured fluid, containing membranous flocculi, and in all of them the ovum was found. In each of them, however, the ovum was softened, very dull-coloured, and easily disintegrated. The zona pellucida had for the most part lost its sharp contour, and, except in one case, no germinal vesicle was discoverable.

Subsequently, in the year 1864, the late Dr. Charles Ritchie had the opportunity of seeing the same thing demonstrated in the ovaries of a married woman, fifty-four years of age, who was sent to me in December 1863 by Dr. Whitehead of Manchester, on account of ovarian disease. She was admitted to the Samaritan Hospital late in May 1864, and ovariotomy was performed on June 2. The pedicle of a non-adherent tumour, larger than an adult's head, on the right side, was secured by a clamp about three inches from the uterus, and the cyst cut away. A second cyst, nearly as large as the first, was then found on the left side, which was also tapped and

emptied. The pedicle of this second cyst was transfixed, tied with strong silk in two halves, and secured to the clamp on the other pedicle after the cyst was cut away. Recovery was uninterrupted, except by a superficial abscess, which formed beside the lower angle of the wound.

The two tumours were examined directly after their removal by Dr. Ritchie, who pointed out to me in each of them a number of small cysts, which were evidently enlarged Graafian follicles. Knowing the great and long familiarity which Dr. Woodham Webb has had with the ova of various species of animals, since his researches in conjunction with Barry, I asked him to examine some of the cysts, in order to ascertain whether they did or did not contain ova—aware that upon this point no higher authority could be appealed to. As one friend had suggested that we may have mistaken a *blood corpuscle* (!) for an ovum, there was evidently some reason for my caution; but I trust that the following note from Dr. Webb will set all such doubts at rest:—

'Both the tumours you sent me, after their removal from a woman fifty-four years old, were growths in excess of true ovarian structure. The multilocular character was produced by clusters of ovisacs of various sizes. Ova, with the other natural contents, were to be found in all the small sacs. The fibrous coats of the larger sacs were thickened, and had many secondary sacs developed in them. The interior was lined with epithelium, which in some instances had, by parthenogenetic enlargement and successive buddings of the cells, given rise to bunches of grape-like growths—repeated generations of imperfect ova. The whole, therefore, was nothing more than a reproduction in the human subject of conditions which are natural in some of the lower creatures.'

As this discovery is of importance in the history of ovarian pathology, I add a letter from Dr. Ritchie, which was published in the 'Medical Times and Gazette,' August 6, 1864. He says: 'Before and since the particular observation referred to, I have been struck with the probability of many so-called ovarian cysts being actually due to degeneration of the ovum itself. In one ovarian tumour, which, through Mr. Wells's kindness, I had an opportunity of examining, I found a number of thin-walled bladders, varying from the size of a cherry to that of a

large plum. These bladders were easily enucleated from the fibrous stroma which surrounded them, and there could be no reasonable doubt that they were Graafian follicles somewhat distended by over-secretion. The interior of these cysts was searched in vain for the ovum, but I was much struck with the fact that in the great majority of them the cyst wall was thickened at one point, and at one only, and that on making a section through that point a small secondary cyst was discovered. No doubt it will be said that at this point endogenous growth had commenced, but it is a significant fact that there was only one such growth to each follicle, and that it lay imbedded in a thickening of its inner coat. What can be more probable than that it was the ovum lying imbedded in its cumulus proligerus? We know that every ovum, whether it be fertilised or not, undergoes certain definite changes on arriving at maturity. . . . . Those changes have, as far as I am aware, as yet only been observed while the ovum was contained in the Fallopian tube; but it certainly is perfectly conceivable that in those cases where ripe follicles fail to burst, the matured ovum should undergo its wonted metamorphosis while still contained in its ovisac. Nor is it absurd to suppose that under those altered circumstances the progressive dilatation of the blastodermic vesicles should occasionally exceed its normal limit, and go on to the formation of a cyst which, in structure and position, would exactly correspond to the little secondary cavity which was seen in the wall of the enlarged Graafian follicle.

'I cannot think, however, that the ovum always stops short at this early stage of its development. Its constant tendency is towards the formation of a new animal, but when deprived of the stimulus of the spermatozoon, it constantly falls short of its aim. Perhaps it may go on to the production of what, were it found in the uterus, would be styled a grape-mole; perhaps other forms of cystic degeneration may be more frequent.'

In Dr. Ritchie's work on 'Ovarian Physiology and Pathology,' published 1865, the following passage appears, p. 197. It shows that he perseveringly continued his researches, and that his industry was not then less rewarded than there is every reason to hope it would have been in other ways, had his career not been stayed by death just as he had gained the impetus of

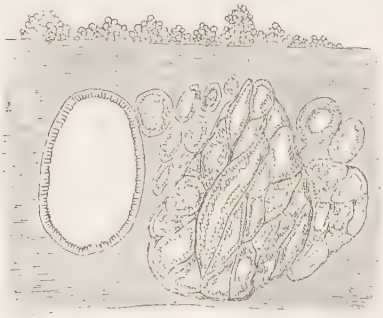
success. 'Since last August, 1864, I have succeeded in finding ova in some of the loculi of a large number of ovarian cysts. Some of the ova were perfect, with a sharply defined zona pellucida, a germinal vesicle and a germinal spot; others were more or less imperfect, many having the appearances mentioned by Rokitansky. I have never found an ovum in a loculus larger than a cherry, and never in a loculus which contained jelly-like contents.'

Among the many pathologists who have investigated this difficult subject, one of the earliest and most masterly is Dr. Wilson Fox, whose trustworthy observations deserve special notice. In a communication to the Medico-Chirurgical Society, read June 1864, he has expressed an opinion that all the forms of cysts met with in the ovary originate from the Graafian follicles, and that the multilocular forms are not the result of any special degenerations of the stroma of the ovary, but are due to secondary formations from the interior of parent cysts. He has studied the modes of formation of the secondary cysts thus formed, and has divided them into three classes.

The first and most frequent manner in which secondary cysts are formed (occurring in ten out of fifteen specimens) is the result of the production of a series of granular structures, presenting a tubular type, on the inner wall of the parent cyst. Dr. Fox describes the mode of formation of these glands as differing from those of other glands, which for the most part originate in the embryo as diverticula from surfaces. The process in this case commences with a stratification of the epithelium, into which project papillæ formed of the stroma of the wall of the parent cyst, each papilla carrying a delicate vascular loop. Villi more or less densely clustered are thus formed, which may pers as such, and then, according to Drs. Wilks, Friedreich, and Luschka, may become covered with ciliated epithelium; but in a large number of cases they become converted into tubular structures by the upward growth of the stroma around their bases. Cysts may be formed while they are thus situated on the surface, from the occlusion of their orifices by mutual pressure; but most commonly the growth of the stroma, by

Tubular glands partially enclosed in stroma.

which this tubular character was first determined, continues until they are completely imbedded in the wall and covered by a fresh layer of the stroma, the surface of which may again become the seat of a new and similar growth of glands and villi. Masses of glands thus imbedded are dilated into cysts by their own secretion, and form the small semi-solid masses which project into the interior of the parent cysts, and in them similar processes may be repeated indefinitely. In



Cysts and Compound Masses of Glands, which are capable of expanding into Loculated Cysts, imbedded in wall of Parent Cyst. (×150 Diam. reduced.)

October 1862 I exhibited at the Pathological Society a tumour which I described as adenoma of the ovary, adding that it might be called fibro-epithelioma or alveolar adenoid tumour. The report in the 'Transactions,' vol. xiv. p. 205, runs thus: 'Mr. Wells had not seen a similar growth in the ovary before, nor had he found it described by any author. A drawing of Dr. Hughes Bennett's, of the structure of chronic mammary tumour, might have been taken from one of the sections shown to the Society. It consisted in great part of an ordinary multilocular cyst; but one large cyst was filled with semi-solid matter which at first sight looked exactly like soft cancer; but after hardening in spirit the true character was made out, and it was seen that the surface of the growth was fringed with papilliform villi, its substance showing in vertical sections a delicate fibrous stroma forming round or oval alveoli. These alveoli are lined with densely grouped epithelial cells, forming a continuous zone which encloses an area loosely packed with cellular elements of similar form. On the margins of most sections the contents of the alveoli are frequently seen to pro-

trude like papillæ through ruptured portions of the fibrous septa; or the lining zone of the alveolus has become liberated and divided so as to assume the appearance of a long cylindrical band or column of epithelial cells. The tumour therefore belongs distinctly to the class of fibro-epithelial growths, and from the folliculoid character of its alveoli would be most appropriately classed as adenoma.' This condition has been described by Rokitanski as occurring in one case which came under his observation, and was published in the Vienna 'Journal of the Society of Physiology, 1860.'

For the more minute description of the changes above mentioned I must refer the reader to Dr. Fox's paper. In three out of the fifteen cases he has examined, where multilocular cysts existed, and in which he could not find the glands last described, Dr. Fox met with a process of secondary cyst formation of a somewhat different character. The cysts in these cases gave off diverticula, which proceeded both from the thin-walled varieties and from those situated in the denser portions of the stroma. In the former case the diverticula (which resembled those in which many glandular structures originate in the embryo from the gastro-pulmonary canal) expanded at once into cysts which projected into the interior of similar adjacent formations; while in the latter, long tubular follicles were given off, portions of which became, by a series of successive constrictions, converted into cysts.

Three Diverticular, or Secondary Cysts, projecting through the outer wall of a Thin-walled Cyst, from a Multilocular Ovarian Tumour. (×90 Diam. reduced.)

The third class of cases investigated by Dr. Fox were those where cysts are found associated with cauliflower growths springing from the interior of the parent cysts. This class, to which the theory of the origin of cysts from single cells has been chiefly applied by Rokitansky, has received a different explanation from Dr. Fox. He describes these growths as solid masses, consisting of a very vascular prolongation of the stroma

of the ovary covered by epithelium, and from the surfaces of which may spring an indefinite number of similar growths. In these luxuriant growths spaces covered by epithelium become enclosed, and, inasmuch as the epithelium forms a secreting surface, these shut spaces become dilated to cysts. Numerous instances of this process are given in Dr. Fox's paper.

Formation of Secondary Cysts, by Tubular Processes given off from Cysts in thicker portions of Stroma. (×250 Diam. reduced.)

Dr. Fox has appended to his paper some analysis of the fluids contained in these cysts, from which, in conjunction with those of Dr. Owen Rees and Scherer, he concludes that their contents are not due to any degeneration of the stroma of the ovary, but that their varying reactions are owing to the conditions of pressure under which the fluids are secreted from the lining membrane of the cysts.

Having thus, in all the so-called 'colloid cysts' examined by him, traced the formation of secondary cysts to newly formed structures of a glandular type (Dr. Fox believes that those found in conjunction with the cauliflower growths must be placed in the same category, 'as they can only be regarded, similarly to the Haversian fringes of synovial membranes, as everted glandular structures'), he calls attention to the observations of Pflüger and Billroth on the origin of the Graafian follicles from tubular processes in the early embryonic conditions of the ovary, an opinion which his own observation leads him to confirm, and he expresses his belief that the origin of all the varieties of these cystoid tumours must be traced to 'a renewal in the adult of the early mode of development of the Graafian vesicle; with various morbid aberrations from the type of embryonic growth, a morbid condition of which we already

possess instances in the mamma, the testicle, and the thyroid gland.'

Dr. Fox believes, though he has not had any opportunities of examining multilocular cysts containing dermic structures, 'that these will be found to follow the same law,' 'inasmuch as they have been shown to contain both normal hair follicles, sebaceous and sudoriparous glands, all of which structures are the frequent seat of cyst formation.'

Vertical Section through a Cauliflower Mass, showing the mode of formation of Cysts; irregular spaces lined by Epithelium enclosed by Papillary Growths. (×250 Diam. reduced.)

aa. Spaces at base of growth.
b. Space at apex, entirely enclosed.
cc. Spaces partly enclosed.

Very recently, in the 'Journal of Anatomy and Physiology' for July 1881, Messrs. Harris and Alban Doran published an account of their studies of the cystic disease of the ovaries in the earlier stages. They had the opportunity of procuring many twin ovaries, which were removed at the same time, and in all the cases the large tumour was multilocular. It was to the second ovaries corresponding to these multilocular tumours that they confined their attention, and 'all were so distinctly enlarged and so abnormal in appearance as to afford the strongest presumptive evidence that they were in a state of incipient cystic degeneration.' Their observations have evidently been carefully made, and they have described and figured the histological changes during some of the stages of the involution of the follicle. I add a summary of their conclusions which confirm much that was either indicated or stated in somewhat different language in my first edition. The varicose origin of some ovarian tumours is not disputed, and 'the partial dilatation and partial obstruction of enlarged and thickened blood-vessels' is part and parcel of such con-

dition; while the follicular origin of many tumours has long been an admitted fact. But no one has before worked satisfactorily upon the early stages of the degenerative changes which render these tumours so serious independently of their mere increase of size; and there is no doubt that the same zeal and intelligence which has brought them thus far will in due time give results enabling us to fill up some of the blanks in this meagre chapter of pathology.

The conclusions of Harris and Doran are stated in these terms:

'1. There is strong evidence that multilocular cystic disease of the ovary may arise from two totally different ovarian elements.

'2. Cysts may arise from partial dilatation and partial obstruction of enlarged and thickened blood-vessels.

'3. Cysts more frequently appear to originate in changes in those Graafian follicles that undergo involution without having ever ruptured.

'4. The morbid changes which replace normal involution of the follicle are an active ingrowth from the stroma, and a long persistence of the cloudy tube-like bodies that represent the remains of the membrana propria of the follicle. These two processes sometimes proceed at an equal rate, sometimes irregularly.

'5. When the relics of the membrana propria are slow to disappear, and the stroma slowly sends ingrowths amongst these relics, we find the cystic bodies containing myxoma-cells partly, at least, connected with the ingrowths.

'6. When the process of ingrowth of stroma into the follicle, during involution, is particularly active, the ingrowths interlace and rapidly form cystic spaces, including portions of the cloudy relics of the membrana propria.

'7. On the other hand, the stroma may show little or no tendency to develop ingrowths, but the relics of the membrana propria may break down very slowly, and end, not in simple effacement and incorporation with the stroma, but in slowly breaking down. This must necessarily end in the formation of a cyst full of a colloid or semi-fluid material, the completely broken down granulosa. In all cases of myxomatous or colloid changes, or simple rarefaction of tissue, we found full evidence

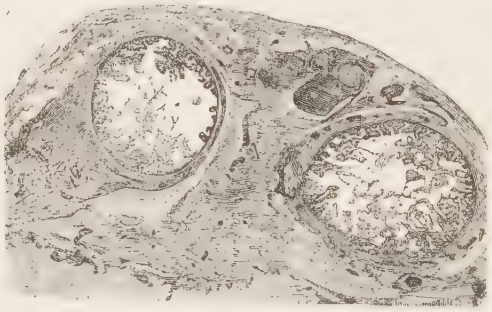
that those changes were in degenerate follicles and never free in the stroma.

'8. All these changes in the degenerating membrana propria and the tissue surrounding the follicle begin as exaggerations of the normal process of involution, which is never a mere disintegration and degeneration of the follicle.

'9. These changes in the follicle do not appear due to inflammation.

'10. The manner in which the young cyst first becomes invested with its characteristic epithelium is obscure. . . . As long as the source whence normal epithelium is renewed remains obscure, so long must this question remain unsettled.'

Still more recently Mr. Doran has been examining the ovaries of a fœtus of seven months, and in one he found proliferating cysts, the origin of which he traces back to the vestigial



remains of some of the tubes of the Wolffian bodies. Two of these cysts are seen in the wood-cut as magnified by a two-inch objective. The right-hand cyst measures $\frac{1}{16}$ in. in its long diameter and has epithelial tufts projecting from its walls. Between the two larger cysts are a number of small cystic or tubular bodies which under a higher power are seen to be lined with epithelium similar to that which invests the growth in the two bigger ones. Stroma continuous with that of the ovary exists in the tufts but cannot be represented. The ovary contained no Graafian vesicles, though they were abundant in that of the other side.

DERMOID CYSTS.

Another form of proliferous cyst is that which is known by the name of dermoid. Here the development does go on to a higher point. The accidental new formations in ovarian cysts, though not so common as the fluid contents, occur often enough to make them not only objects of curiosity but of pathological importance. Among these substances may be mentioned striated muscular fibres, brain and nerve tissue, bone, adipose tissue, and all sorts of dermoid structures—such as hair, teeth, and glands. As a rule, the growth of cysts of this kind is arrested after a certain time; they remain stationary; and if the abdomen of the patient goes on enlarging, it is generally owing to the outpouring of ascitic fluid from the irritation to which the cysts give rise. Sometimes inflammation and suppurative action set in, and the contents are discharged by apertures communicating with the natural passages, or through fistulous openings in the abdominal walls.

The new formation of striated muscular fibres has been observed by Virchow, who gives the following description. The accumulated stroma in a large ovarian tumour formed prominences in different parts of the cyst walls, and between the cysts a large quantity of dense tissue was found as a fibrillated, whitish mass, in which were imbedded nodules of various sizes—from that of a cherry to that of a large apple—and of a yellowish white colour. There were a few among them which had an almost glandular appearance; they were delicately mottled with yellow, and were firm, but not hard. They nowhere presented a distinctly fibrillated or fascicular arrangement. But, under the microscope, dense layers of striated muscular fibres were seen, having the same form and general characters as those of the embryo. The single fibres were long, moderately broad, fusiform cells, with a long oval nucleus, and well-marked transverse striation. Virchow suggests for tumours containing such tissue the name of Myosarcoma.

Brain matter, as seen in these cysts, has been described by Gray, Chalice, Friedreichs, and Rokitansky. Gray found a tumour the size of an orange, consisting of five cysts. Three of these contained fat and hair; one of them also bones and

one tooth. The fourth cavity was the size of a walnut, had very thin walls resembling the pia mater, forming like that a sort of meshwork, and it inclosed a brain-like mass, in which the elements of the gray substance and nerve fibres were discernible. The fifth and smallest cyst had similar contents. Chalice discovered a soft, white and grayish substance, resembling brain, in the ovarian cyst of a young girl. And Rokitansky met with an independent nervous apparatus, arising from a ganglion, in a cylindrical osseous new formation, covered with true cutis, growing into an ovarian cyst. The mass was also vascular. The reddish ganglionic substance was enveloped in a capsule formed by two layers of the cell wall. A nervous cord issued from the ganglion, and sent ramifications into the osseous body, which were ultimately distributed in the same way as the nerve fibrils of the cutis.

Friedreichs examined an ovarian cyst of the size of an apple, consisting of two cavities. A conical mass of cuticular structure was attached to the uterine end of the larger cavity, and projected into it. This body was covered with hairs, contained adipose tissue, complete and rudimentary sebaceous glands, and distinct nerve fibres, with double dark borders. Numerous recently formed vessels, and thirty strong cords of broad nervous branches, with double borders, were found in the areolar tissue of the expanded membranous septum. On the opposite surface of the septum, forming part of the smaller cyst, there were thick whitish layers, of very soft consistency, which were made up of innumerable thin, varicose nerve fibres, with well-defined borders, and all having the same direction and parallel arrangement. Between these were interspersed irregularly thicker nervous elements, with double borders. There were also large unipolar and bipolar pigmented ganglionic cells, with large round nuclei. A delicate capillary network pervaded with its large meshes the whole new-formed medullary substances, and was kept together by a fine but perfect investing membrane. The nuclei of the connective tissues in this were partly pigmented, and partly in a state of fatty degeneration. At two points in the white medullary nerve substance there were seen extremely soft, almost pulpy, grayish, transparent masses, which consisted of nerve cells, with circular nuclei (gray substance). These were

also supplied with small capillary vessels. Virchow has seen a similar case.

Genuine dermoid cysts occur most commonly in the ovaries, although not exclusively so, as they are sometimes attached to the peritoneum, and may be developed in other parts of the body. Of one hundred and eighty-eight instances of dermoid cysts which Lebert reports, one hundred and twenty-nine were in the ovaries. In my own experience the greater part were ovarian. Nor are they peculiar to the female sex. They occur in man and in the males of other species.

The ovarian dermoid cysts may be either single or multiple, and several of the cysts in a multiple tumour may contain similar structures. The cyst walls are mostly thick; the inner surface may be uniformly smooth, but more often is made uneven by being scattered over with circumscribed elevations, some of which may even rise into conical hillocks. The lining membrane is composed of thick layers of pavement epithelium. The uppermost strata of cells are scaly and without nuclei; those beneath show the nuclei, and the deepest-seated are round cells newly formed; the same arrangement as in the epidermis. This cuticular layer is often more than two millimetres thick, and rests on a bed of areolar tissue, which, like the cutis, is furnished with papillæ of the usual forms. Although these papillæ are as closely packed together as on the palm of the hand and fingers, they are not arranged in parallel rows or regular groups, and are different in size and length. Next to the papillary layer comes a mass of looser areolar and adipose tissue. In this sort of mock skin the usual tegumentary appendages are often developed in considerable quantities. Abundant tufts of hair are thrown out, sometimes several inches in length, more commonly fair or of reddish colour than brown or black. The hairs grow from distinct follicles, with which sebaceous glands are connected. Other sebaceous glands open directly on the surface of the cyst. Kohlrausch, Heschl, and others have also remarked sudoriparous glands with very much their natural form and disposition. Wedl mentions, in respect to the hair, that notwithstanding its considerable length, it more resembles in general structure the short hair of the body than that of the scalp. The follicles do not lie so deep, and the bulbs are more conical

and elongated. The bone developed in these cysts shows itself first as minute laminæ in the areolar tissue beneath the skin formation. These, as they grow larger, get into most extraordinary irregular shapes, with branches and spicules, or into lumps, composed more of dense compact substance than of porous spongy tissue. The pieces sometimes have a distant resemblance to some parts of the skull, and this is more striking when teeth, as they very often do, grow in regularly formed alveoli, such as are seen naturally in the jaws. The osseous structure itself is that of genuine bone, the Haversian canals and bone cells being arranged in lamellæ, though the cells are often large, and have fewer intercommunicating branches. In some instances, pieces of bone are held together by a sort of spurious articulation, formed by the periosteum and some dense fibrous tissue. Such a case is recorded by Heschl. The teeth develop either in the osseous substance or in the cyst stroma. They sometimes project into the cyst, or may be completely buried in the areolar tissue. Some are perfect, and have all the structural arrangement of ordinary teeth, but the greater part remain in a rudimentary condition. According to Meckel, they observe the same natural order of succession, and a deciduous tooth will be seen atrophied from root to crown by the pressure of a permanent tooth growing under it. So it was in one of the tumours removed by me in operation (Case 329). But a great many of the teeth are badly formed, and have certain parts deficient or in excess. The number in a single cyst is sometimes extraordinary. Schabel describes the case of a girl, aged thirteen, not having menstruated, and in whom there was an ovarian cyst, three times the size of a man's head, containing three pieces of bone and more than a hundred teeth of all classes, but mostly incomplete, without proper roots. Paget mentions a cyst in which more than three hundred teeth were found.

Besides the adipose tissue forming part of the organised mass in these tumours, the sacs often contain a large quantity of greasy substance, mixed up with tufts and balls of matted hair. This consists of free fat, exfoliated epithelium, with sometimes so much cholesterine that the crystals give the whole a glittering appearance. With a surface of skin and sebaceous glands, there is no difficulty in accounting for the

presence of these concretions. Rokitansky found this fatty compound in one case rolled into a number of round balls. The cyst, the size of a large head, had contracted adhesions below with the ovarian ligament, and above with the anterior layer of the middle portion of the mesentery of the jejunum. Thus balanced, the cyst was twice rotated on its axis from left to right. It contained a quantity of brownish, viscid fluid, numerous balls of matted hair, as large as a walnut, seventy-two balls the same size, made up of fat in concentric layers, and a great number of smaller globules, not bigger than peas. Fatal constriction of the intestines had been the result of the rotations of the tumour, and Rokitansky accounts for the peculiar condition of the contents by the churning motion. Dr. Routh found the fat and hair in a cyst which he removed from an old woman in much the same state. The balls had concentric layers of amorphous fat round a nucleus of cholesterine crystal.

The question whether these dermoid cysts are the result of impregnation (direct or secondary) does not need discussion. They have a character quite distinct from that of extra-uterine fœtations, and grow, independently of spermatic contact, in young children, and even before birth, and in situations and under conditions where such influence would be simply impossible. The peculiar formative and reproductive power inherent in the tissues of the body is as operative in the production of these vagaries as it is in the crops of multiform morbid growths which spring up everywhere under circumstances of which we can give no rational explanation.

The doctrine of the ‘ continuous development of tissues out of one another,’ as Virchow calls it, will suffice to account for the growth of all ordinary dermoid tumours, no matter in what part or sex they are found. Those of the abdomen, whether in males or in females, whether in the ovary itself or out of it, whether the solid dermoid structures are the original basis of the tumour or whether they are secondary productions from the cyst substance, are no exceptions.

But the tumours formed as the result of direct impregnation are of quite another character. Extra-uterine fœtation may take place in the ovary, or in the Fallopian tube, or on the peritoneum, but so long as the embryonic development is

natural, it has no analogy with the hetero-plastic mass of the dermoid. They are not morbid products to be classed among diseases of the ovary; and though in their early stages the fact of enlargement may raise the question of cystic formation, the further growth brings with it the solution, and the patient either dies of hæmorrhage or has to submit to abdominal section, or carries a lithopedion to her grave. With a deviation from typical conformation, an arrest or perversion of nutrition and degradation, the product falls into the category of tumour, but still, instead of becoming a dermoid excrescence, it remains an embryonic evolution.

Neither need we go beyond this simple doctrine to range in their proper place the anomalous cases of what are called 'monstrosities by inclusion,' or 'kystes fœtaux par inclusion.' It is as superfluous to call in the hypothesis of Boinet of double impregnation and fœtal inclusion, or that of a partial displacement of the outer layer of the blasto-dermic membrane, or the roundabout suggestion of Lebert of the primary generation of skin from the elements of the part invaded, and its secondary throwing out of structures and organs, to explain these formations, as it is to insist upon the embryonic origin of every dermoid tumour.

In my own experience the larger number of dermoid tumours were distinctly ovarian, but, like other operators, I have sometimes found them without pedicle, and dependent upon their parietal or omental adhesions for the supply of blood. They occasionally, after acquiring a certain growth, remain quiescent for many years. Atlee describes the post-mortem examination of a lady who died at the age of seventy-nine, in whom the tumour was recognized by his uncle forty-seven years before. In this case there was no pedicle.

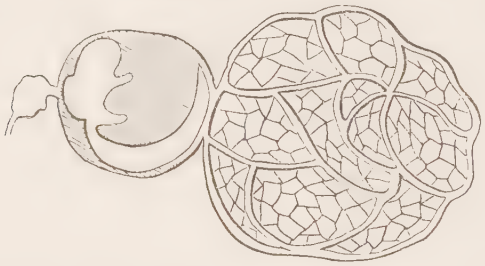
The dermoid tumours are usually spoken of as rare. Peaslee vaguely says they are found in the proportion of $1\frac{1}{2}$ or 2 per cent. I met with ten among my first five hundred cases, and twelve in the second five hundred, but patches or nodules of the growths in question are not unfrequently discovered in the walls of cysts, which, from the predominance of other characteristics, are not ranked in this class. In fact, as a subdivision of the proliferous cysts, the dermoid has no definite limits, and the gradations from the encysted fœtus, however

monstrous, through all the varieties of hard and soft tissues may be regularly traced down to the simple hypertrophy of the connective tissue of the ovary, or the part in which the growth originated. It is only a question of the force of formative power. In ordinary cases it goes no further than the production of cyst walls with a secreting endothelium, which pours out fluid contents. In others, though the cell growth is enormous, there is no disposition to organization; the vitality is low, and all the phenomena of degradation show themselves in the form of proliferous excrescences, cancerous and colloid masses.

Again, when Graafian vesicles sprout up in the cyst walls there is mostly an arrest of development, and nothing more than secondary cysts are produced. Where the formative impulse is stronger, some of the connective tissue and fibre of the cell wall assumes the muscular type; other of the embryonic tissue cells advance in the direction of cartilage and bone, and with a still more exaggerated impulse the developmental action approaches so nearly to that which is natural that complicated organs and entities, monstrous, it is true, reflect the form of the species in which they take their origin. They were in times past looked upon as inexplicable marvels, and not only had their entry into museums as treasures, but were described with scrupulous verbosity. There is, however, nothing more extraordinary in them than in the appearance of bone in the gluteus, or imperfect brain-like matter in the substance of the mammary gland, or fibrous nodules in the lobes of the cerebrum. Their chief surgical interest is in the obscurity they throw over diagnosis, and in the complications they occasion.

I formerly gave the descriptive details of ten cases. The first and second had no special peculiarities. The third was an Irishwoman, married, 27 years of age, and mother of four children, who recovered very speedily and gave birth to another child nine months after the operation. The fourth was a single lady, and in her case the tumour consisted of three distinct portions, as shown in the diagram (next page): the ovary, the dermoid growth, and a large cyst with fluid. The greater part of the hard, fibrous, almost cartilaginous walls of the dermoid cyst, which was the size of an orange, was ossified, as indicated by

the shading in the diagram. The bony portion was a flat expansion nearly surrounding the cavity; and from the inner side of it there was a thick solid mass of bone projecting, which had very much the shape of the lower jaw of a rodent (less the coronoid process), and set with badly shaped teeth. The fifth and sixth patients were married women aged 37 and 22. The seventh was a girl of 18, who had been menstruating only six months, was one of twins, and had noticed the growth of the tumour for four years. In the next patient, 38 years old, the tumour had been growing for eighteen years. She had married during that time and had three children, the tumour lessening with the progress of each pregnancy. There was no pedicle,



the blood supply having been kept up through the vessels of adhering omentum and mesentery. She was pregnant at the time of operation, and was delivered of a living child seven months after. The ninth patient was barely 17 years of age, with a tumour of three years' date, and a long pedicle three times twisted on itself. All these cases did well. The tenth case came into hospital too late for operation. Tapping brought away some pints of turbid yellow fluid with lumps of fat.

In 1874 I operated on a little girl from California, eight years old. The case is not unique, but is worth recording. The child was rather small for her age, and the central part of the abdomen was occupied by a loose, movable cyst. After consultation with Sir W. Jenner and Dr. Sutro, I tapped with a fine trocar and aspirator, and obtained twenty-six ounces of ovarian fluid. A hard substance like half an orange was felt to the left side after the fluid had all escaped. The child did not suffer at all after the tapping, but the fluid soon began to distend the cyst again, so that at the end of about three weeks I

operated for extirpation. I made an incision of three inches, drew out the cyst, tied a long pedicle, and the knots of the ligature were allowed to fall back into the pelvis. On examining the uterus and other ovary with one finger, I was doubtful which ovary I had removed, though I believed it was the left. The uterus did not feel as large as a walnut, and I could not find an ovary nor the ligature I had just applied. The tumour was dermoid, but had nothing extraordinary among its contents, and is preserved in the Museum of the College of Surgeons. The child recovered perfectly, and sailed for New York twenty-five days after the operation. I heard from Dr. Cole, of St. Francisco, who was present during the Congress in London, August 1881, that she remains in good health.

This year I saw a very similar case in a young lady aged 13, from Boston, U.S. Sir James Paget and Mr. Thornton had both discouraged operative measures, fearing that the growth was malignant. An exploratory puncture threw no light on the matter, and on my strong recommendation it was arranged that Mr. Thornton should remove the tumour, as I fully believed it to be a dermoid cyst of one ovary. Sir James Paget and I were both present at the operation, which Mr. Thornton performed without difficulty and with a successful result, disclosing, as I anticipated, a dermoid growth.

The bones and teeth of many of these tumours have been beautifully prepared for me by Dr. Junker by a process of his own devising. After removing most of the surrounding soft structures, he scalds the harder parts with boiling water to which a few drops of hydrochloric acid have been added. The bones are left in this solution about ten minutes, then washed and boiled in plain water until all the soft matter is loosened. This is cleared away by a stream of water. The bare bones are then boiled a short time in a strong solution of soda, washed with soap and water, and, when perfectly clean, dehydrated in boiling alcohol. These specimens may be seen in the Museum of the College of Surgeons.

CYSTOSARCOMA.

In most of the tumours hitherto mentioned, the cystic cavities have been the most noticeable features. But it

sometimes happens that, though a number of cysts exist together, the cavities are in a measure obliterated and their presence obscured by the hyperplastic condition of their walls. These overgrown partitions are made up of a fibrous vascular mass not in any way to be distinguished from that usually seen in cyst walls. Its excessive quantity is its only peculiarity, and by its encroachments on all sides the area of the cysts and the amount of their contents are proportionally diminished. Some authors have given to this form of the disease the name of cystosarcoma. The solidity or softness of these tumours will of course depend on the relative growth of the walls, or the expansion of the cysts. It is not at all uncommon to find them in connection with large cysts developing perhaps in some part of the walls, or more commonly towards the base. In some cases, the whole ovary, having given rise to one or more large cysts, increases after this fashion. It grows very rapidly, and has a strong hæmorrhagic disposition, causing also in some cases effusion of blood into the cyst cavities.

In Case No. 111, the fluid of the first tapping was transparent and straw-coloured; of the second thicker, of a light port wine tint; of the third, six or seven weeks later, after a good deal of emaciation, of a dark brownish-red colour, containing a large quantity of blood. During the operation several large masses of clot and fibrin were turned out of the cyst. Dr. Ritchie reported of the cyst that the thickness of the walls was increased at intervals, the increase being most marked at one point where the sensation given to the finger was that of the presence of a fibrous tumour in the walls of the cyst. This tumour was eight inches long, six inches broad, and from one and a half to two and a half inches deep. It consisted of ovarian tissue, many of the meshes being filled with lardaceous deposit, some loculi undergoing fatty degeneration, and others becoming purulent. In the loculi nearest the large sac the internal wall had given way, and the contained clot projected like a fungoid mass, which was easily broken down with the finger, and resolved itself into shreds and granules. The lining membrane of this part of the large cyst had a mucoid appearance, and was excessively vascular. Large veins ran in every direction, and several of the largest of them were more or less corroded. Some of the corrosions did not extend through all

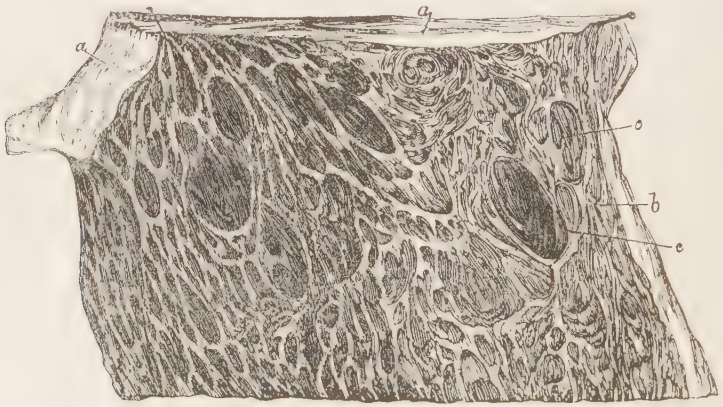
the coats of the vessels, and these appeared under a magnifier as small ulcers with ragged edges. Where the ulcer had eaten through and through the vessel, blood had been effused and a clot formed. The accompanying engraving represents some of the vessels.

In another case, No. 96, Dr. Ritchie found the cyst walls in some places two inches thick. In this part 'were developed between the two internal layers, and intimately connected with them both, a mass of cysts varying from the size of a pear to that of a pea, the larger ones being compressed laterally, the smaller ones retaining the spherical form. The extremities of the ellipses formed by the larger among these bladder-like vesicles projected into the principal cavity, whose walls formed crescentic margins around them.'

The solid matter of the tumour removed in Case No. 97 consisted of honey-combed masses, whose cells contained a thick, white, semi-solid substance, of the consistence of tallow. The greater part of the tumour reported on by Dr. Ritchie, in Case No. 99, was made up of a resistant mass of about the size and shape of an ordinary placenta. 'On making a section through this it was found to be invested on every side by a firm fibrous capsule, about two lines in thickness. This capsule sent projections into the interior of the tumour, and these projections met and crossed each other at different angles, so as to form a network. From the interstices of the network projected a number of thin-walled translucent vesicles, con-

taining a colourless fluid. The largest of them did not exceed the size of a small plum, while the smallest were mere specks. Most of the larger ones had been forced into an elongated oval shape, and as they projected from the fibrous network, the latter formed a sort of collar which embraced them. Some of the vesicles were very vascular, receiving little trunks of vessels, which ran along the fibrous bands. The vesicles could be enucleated entire. They appeared to be formed by a base ment membrane, epitheliated internally, and covered externally with shreds of fibrous tissue.'

The meshes of the tumour removed in Case No. 104 varied very much in size. The great majority of them appeared to be about the size of a pin's head, and separated from each other by partitions about one quarter of a line thick ; some of them, however, were three-eighths of an inch broad, and one inch or more long. The walls of these were considerably (perhaps



four times) thicker than the others ; they could be dissected free, and were found to be continuous with and to branch from the tunica albuginea. One thing is worthy of notice—the larger cysts were not spherical, but elliptical.

The tumour in Case No. 113 weighed from fifteen to twenty pounds ; its texture was soft and friable, so that in handling it tore by its own weight. On what had originally been its inferior and posterior aspects it was much broken up, but it was impossible to say how much of this was due to the operation itself, how much had been antecedent to it. The external

surface of the tumour was in some parts marked by traces of adhesions. The structure of the tumour was tolerably simple, and is well shown by the accompanying engraving, which is a section perpendicular to the surface, and reduced to a quarter of the actual size.

The investing membrane, the tunica albuginea (*a*), is seen partially in profile; continuous with it the fibrous trabeculæ (*b*) enclose small spaces (*c*); these spaces were filled originally with mucoid fluid.

FIBROUS TUMOUR.

A true fibrous tumour of the ovary is a thing of very rare occurrence, so rare indeed that until the year 1872 not one, distinctly characterized and taking its origin in the ovarian tissues, ever came under my observation. And it will be found that many cases reported as ovarian fibroids are in reality tumours beginning in the uterus, which overgrow and involve the ovary so as to disguise its natural appearance or conceal it altogether. Kiwisch maintains that he has found round solid fibroids of considerable extent in two cases; in the one the size of a child's head, in the other about as large as a small adult head. Such tumours have, he says, in general, very little tendency to undergo dangerous metamorphosis, though in the Surgical Clinique at Prague he lost a patient by what he calls 'partial decomposition of an ovarian fibroid.'

Speaking from personal observation, there seems reason to doubt the correctness of the diagnosis in these reports. Indeed, more than a hundred cases are on record where the abdomen has been opened with the object of removing an ovarian tumour, but the operator discovered, after making the incision, that the tumour was not ovarian, but uterine. And further, some of the tumours actually removed, and believed by the operator to be ovarian, have been proved on careful examination to be really fibroid outgrowths from the uterus, more or less pedunculate. In one case of excision of a pedunculate fibro-cellular outgrowth from the fundus uteri, I only discovered what I had done by finding both ovaries healthy, and when this tumour was exhibited at one of our Societies I had difficulty in convincing some of the Fellows that it was not ovarian.

In the year 1871 a specimen shown at the Obstetrical Society

of London, illustrating an operation for double ovariotomy, was reported on by Dr. Meadows and Mr. Scott as being composed of hard, dense fibrous tissue, but having in some places a kind of reticulated appearance. Under the microscope it was seen to consist of white fibrous tissue, some elongated fibre cells, and a few rounded granular cells and granules. The reporters added that it seems possible that the tumour originated in the fibrous stroma of the ovary, and that its growth in one direction did not interfere with that portion of the ovary which still maintained its normal character, and, so far as could be judged, performed its ordinary function. Dr. Wilson Fox also reported on the same tumour, and states it to be a 'loculated fibroid; but in the more central and transparent parts of the loculi there are a great number of non-striated muscular fibres. It is very difficult to isolate non-striated muscle after a preparation has been in spirit, but there are a number of broad-banded fibres not affected by acetic acid (as the surrounding bundles of fibrous tissue are) and containing long fusiform nuclei.' The remains of the ovary appeared to me to be separable from the tumour; and, while not denying the *possibility* of a tumour largely made up of non-striated muscular fibre originating in the ovary, I think it must be excessively rare, as I have seen but few examples; whereas originating from the uterus they are among the most common of morbid growths. In the spring of 1872, however, I twice operated for what were really fibrous tumours of the ovary, the right in both cases. One weighed nine ounces, the other four pounds and a half. There was a large quantity of fluid in both the peritoneal cavities. One patient was in the third month of pregnancy, the other a single lady. Both recovered. One of these tumours is now in the Museum of the College of Surgeons. Since writing the above, in four other cases I have removed ovaries in which the tumour was distinctly fibrous. The first of these was a solid mass weighing five pounds six ounces. The second was much larger, and amounted to twenty-three pounds six ounces. In this case there was an indistinct sense of fluctuation, which was supposed to be masked by fat. The next time I found both ovaries in the same condition and took them away. The patient recovered, but died a year after. I met with another such tumour of about fifteen pounds, in 1879, and in this lady there was a large quantity of ascitic

fluid, present. She, however, remains quite well at the end of 1881.

CANCER.

The ovaries, like all other parts of the human body, become the seat of cancerous disease. It assumes no special forms in them. Every kind of cancer infesting other organs is in turn reproduced in the ovary. The peculiarity of its tissues and the arrangements of its component parts perhaps in some respects facilitate the development of the disease. The fibrous stroma, the dense investment, the abundant groups of innocent reproductive vesicles, and the ever-growing intrafollicular epithelium, seem respectively typically to prefigure the forms of scirrhous, colloid, papillary, and medullary cancer.

Paget says (p. 613, edition by Turner): 'The most remarkable examples of hard cancers with fibrous structures that I have yet seen have been in the ovaries of certain patients with common hard cancer of the breast or stomach. In these cases the place of the ovary on either or on both sides is occupied by a nodulated mass of uniformly hard, heavy, white, and fibrous tissue. The mass appears to be, generally, of oval form, and may be three or more inches in diameter. Its toughness exceeds that of even the firmest fibrous tumours, and its component fibres, though too slender to be measured, are peculiarly hard, compact, closely and irregularly woven. They are not undulating, but when they can be separated, singly or in bundles, they appear dark-edged, short, and irregularly netted. With these I have found only few and imperfect cancer-cells, with more numerous nuclei, elongated and slender. They are not mingled with elastic or other "yellow element" fibres.'

The tendency of the cystic form of tumours to degenerate into that known as colloid cancer is very apparent. But the colloid characteristics may be present from the very commencement of the disease and occupy the whole organ; while in some cases all the conditions coexist, and in the same tumour are found cysts with an almost pure fluid, other spaces with the jelly-like contents, and some again exclusively filled with the dendritic epithelial growths passing into the soft state of medul-

lary cancer. The colloid cancer is a sort of intermediate form of disease, having intimate alliances and resemblances, on the one hand, with the innocent single cysts, and, on the other, often being intermingled and confused with the most rapidly spreading and malignant cancer growths. It grows quickly and largely, but, not having a tendency to destroy life by reason of any special poisonous virulence contaminating the whole system, it is seldom that there is an opportunity of examining the primary stages of its formation, except when tumours have been removed by operation. They consist of a mass of countless alveoli, often involving the entire ovarian structure, and acquiring a bulk equal to that of any of the cystic tumours, and filling up the pelvis and abdomen. These cells, or alveolar spaces, are of all sizes ranging upwards from that invisible to the naked eye. In some parts the appearance is that of fine sponge, and in others the alveoli expand into the round or oval form of cysts. Generally some of these larger cysts grow and predominate over the others, and form protuberances, or projections on the surface of the mass. Many of the spaces communicate with each other, though there are generally indications that they were all originally separate. The partitions of the alveoli are made up of white, shining, and firm though delicate fibrous tissue; and, in the case of dividing large spaces, have considerable thickness and are not sparingly vascular. The smaller cavities are often only limited by membrane of extreme tenuity, and it does also happen that occasionally even the larger accumulations of semi-fluid matter are only held together by the finest films of tissue. The contents are a tenacious, viscid matter. Its consistency varies from set-jelly solidity to a ropy, glairy mucoid, which may be drawn out into strings. It is seldom clear and colourless; often brown or yellowish, or even a pale green, having mixed with it flocculent, whitish, creamy substance, and many epithelial cells, oil drops, and granular matter.

The tumour removed, Case No. 3, Nov. 5, 1858, from a married woman, aged thirty-three, was thus described at the time in the simplest language, without any theoretical bias as to its pathological classification. Some two or three pints of its contents having been previously emptied, it weighed on removal twenty-one pounds. The external capsule was firm,

fibrous, and very vascular; section showed an immense number of imperfect cysts, or alveolar cavities, from the size of a pea to that of a small apple; and one large cyst, which had contained from two to three pints of viscid fluid. The walls of the cyst and alveoli were very vascular, inclosing a semi-opaque, jelly-like substance, varying in colour from white to dark chocolate in different places, and in consistence from that of firm jelly to that of white of egg. By a little pressure this matter was made to exude easily from the divided cavities. Thus the tumour might be described as a fibrous network, forming irregular cavities containing gelatinous matter. After maceration and squeezing out the contents, the septa were seen to form very imperfect separations between the cavities. A great quantity of molecular matter was seen, with free nuclei, and small oval cells about the diameter of blood corpuscles; also numerous large granular corpuscles, from two to three times the diameter of blood corpuscles, and an abundance of oil globules. When exhibiting this specimen at the Pathological Society in 1859, I said: 'It is a question, however, whether the distinction between the compound ovarian cyst and true colloid disease is as well made out by any observation of minute structural difference as in the clinical history; especially in the important fact that the former disease shows no tendency either to reproduction in distant parts of the system, or to contaminate neighbouring parts or glands.'

The subsequent history gives some importance to these remarks. The woman made a rapid and uninterrupted recovery, and remained well for some months, doing field work, and having gained, early in 1859, fifteen pounds in weight. But in July she began to suffer from symptoms of chronic peritonitis, followed by those of obstructed intestines, and died on August 26.

Mr. Jardine, of Capel, near Dorking, sent me one specimen taken from the body, which showed a portion of the abdominal wall, containing the cicatrix, the peduncle of the removed ovary adhering to it, and connecting it closely with the uterus; and the left ovary, in which disease had commenced, and gone on to the formation of a compound cyst about the size of a small orange. Another specimen, which I also preserved and laid before the Pathological Society, showed two strictures of

the ileum, very near the cæcum, caused by cancerous deposit between the peritoneum and muscular coat of the intestine. A similar deposit, in small nodules, had been strewed over nearly the whole of the peritoneum and its reflections. Mr. Jardine examined the structure of these nodules microscopically, and reported as follows: 'The masses are, when small, only between the peritoneum and muscular coat of the intestines, and have a distinct limiting membrane of their own; nowhere appearing to be infiltrating growths. As they increase, the general tendency seems to be to push out the peritoneum, and to become pedunculated, rather than to spread flatly under it. The bulk is composed of cells about the size of pus corpuscles, with large nuclei (in some cases almost filling up the cells), refracting light more strongly than the cells themselves. Most of the cells approach the globular form, but many are fusiform and elongated. No nucleoli, but some oil globules in cells, and nuclei, and much free oil; a small amount of fibrous tissue running throughout, but not with definite arrangement.'

Simple cysts may arise in the ovary and do nothing more than enlarge, or their epithelium may degenerate independently and go on to the formation of the worst forms of epithelial cancer. Dendritic growths spring up; and the steps of their formation, so far as they can be seen, are as follows. An epithelial cell elongates and projects into the cyst cavity—that is to say, a scale of tesselated epithelium becomes columnar. The columnar epithelium becomes stratified by the continued upward growth of cells. Lateral offshoots are sent out, and these offshoots again subdivide into minute ramifications. Shut cavities may be formed by the accidental cohesion of their branches. Loops of vessels accompanied with fibrous tissue grow upwards from the stroma into the dendritic formation. They increase rapidly, and soon show their affinity to, and tendency to degenerate into the condition of medullary cancer. The engraving on next page is a magnified representation of the transverse section of the wall of an ovarian cyst, which is entirely composed of fibrous tissue, except at its upper margin, where it is epitheliated, and where the dendritic growths are in active progress.

Simple cysts may also be surrounded with colloid or medullary growths, and from contact or close proximity may be

induced to make this secondary addition to the general mass of disease. Or the cystic disease of the ovary may advance in one part after the simplest manner, while in some other part medullary cancer may make its invasion of the organ in its usual way, either as an infiltration of the tissues, or by taking at first limited action and giving origin to a capsulated tumour, which, after enlarging, softens, yields at one point of its coats, and shoots forth fungous outgrowths.

But sometimes the true cancerous disease attacks the ovary without any preliminary formation of cysts, destroys its structure, speedily runs over the peritoneum, and insinuates itself into the lymphatics, glands, and viscera. The disease is

usually one of middle or advanced life, but, in one of the cases reported hereafter, it will be seen that the age of the patient did not exceed fourteen years. Its progress is rapid, and occasions the pouring out of ascitic fluid, and many other complications perplexing the diagnosis. In all the three patients whose history is now given, the question of ovariotomy had been considered, but had been negatived, both by local conditions of the tumours, and by the visible cachexia indicative of malignant disease.

Cancer of both ovaries.—E. A. N., æt. 44, was admitted into the Samaritan Hospital on June 3, 1862. Married for fourteen

years, but has never conceived. No hereditary influence can be traced. Three years ago the patient discovered a tumour in the left iliac region; at first it was not painful, but produced incontinence of urine. After some months this latter symptom disappeared, and about a year ago the swelling became so painful that the patient was obliged to confine herself to bed. Six months later, the catamenia, which had formerly been regular, ceased, and did not return. Four months ago the patient was tapped in St. Bartholomew's Hospital. One hundred and fifty-eight ounces of fluid were removed; but, after the operation, a large solid mass remained behind.

On admission the breathing was hurried and incomplete, the legs slightly œdematous; the girth at the umbilical level was forty-one inches, the distance from the ensiform cartilage to the symphysis seventeen inches. The whole anterior part of the abdomen was dull on percussion. Fluctuation very evident, and on making deep pressure the fingers impinged on a hard body, whose outline could not be defined. The patient was tapped by puncture made with a lancet, and fifteen pints of glairy fluid drawn off by means of a syphon. After riddance of the fluid, the tumour was found to stretch from the left groin across the abdomen to the right hypochondrium. It did not appear to be adherent to the integuments. *Per vaginam*, several hardish immovable masses were felt behind the uterus. The patient became gradually weaker, and died on July 19.

Ascitic fluid filled the peritoneal cavity. Both ovaries were diseased and increased in size, and contained several cysts. Dr. Aitken, of Netley, examined portions of the ovaries, and reported a number of cysts, some simple, some proliferous, and a mass of malignant growth which had grown to and encroached upon the rectum.

Cancer of left ovary and ascites.—E. T., æt. 59, was admitted into the Samaritan Hospital on December 6, 1863. Twice married, no children, no hereditary disease, never seriously ill (with the exception of an attack of pelvic cellulitis, fifteen years ago), but living in a crowded part of London and badly nourished. She had not menstruated for five years.

Twelve months before, a tumour was found in the hypogastrium. Abdominal enlargement, ascites, and prolapse of the womb quickly followed. She was then relieved by tapping,

which, in eight months, was repeated five times; the evacuated fluid was described as being thick and glairy.

On admission, emaciation considerable, expression anxious; the skin cool, and the feet, especially the left one, are cold. The patient states that she frequently perspires on the left side of the body, never on the right. The left leg is extremely œdematous, and its veins are varicose. She always sleeps on her back, being unable to turn on her side on account of a rolling weight in the abdomen. Pulse 104, thready; sounds of heart normal; urine slightly diminished in quantity, with a copious deposit of urates. Considerable pain before and after micturition. On examination, the abdomen measures at the umbilical level thirty-nine inches in circumference, while the distance from the ensiform cartilage to the pubic symphysis is fifteen and a half inches. The superficial veins of the abdomen are dilated; the lower ribs pushed outwards, and the liver somewhat displaced in an upward direction. Fluctuation is very distinct, being evidently due to a collection of ascitic fluid. Crepitus is both to be felt and heard on the right side. On making deep pressure, a resistant nodulated tumour is felt, filling the hypogastric and part of the iliac region; its mobility is very limited, its tenderness not very great. Vagina œdematous; os uteri virginal; uterus retroverted.

In December, sixteen pints of a yellowish fluid, not unlike pale ale, of a specific gravity of 1020, were taken away by tapping. It was highly albuminous, and under the microscope it was found to contain red and white blood corpuscles. After tapping, the patient became very faint; but she rallied and lingered on till February 26, 1864, when she died exhausted.

The post-mortem revealed the presence of some ascitic fluid, of cancerous warts on the peritoneum, and of a large multilocular tumour of the left ovary. This tumour was adherent in front to the bladder, behind to the rectum, and on the left to the pelvis itself, as high as the crest of the ilium. The adhesions were too strong to be torn, and the tumour was almost immovably fixed. The right ovary was also the seat of cystic degeneration. The tumour of the left ovary was carefully examined, and exhibited, in different parts, unmistakable appearances of cancer.

Soft cancer involving the ovaries of a child.—January 19,

1864, saw the patient with Mr. Berry. E. C., a scrofulous child, æt. thirteen years nine months, began to menstruate eight months ago; four months later she had an attack of erysipelas of the face and head, from which she recovered tolerably well. Five or six weeks ago she was troubled with constant desire to make water, and two weeks later the catamenia came on; since then they have never ceased. Simultaneously with the appearance of the catamenia, a small tumour was observed in the hypogastrium. At first it increased slowly, but within the last three days it has reached its present dimensions. There was a distinct firm tumour filling up the whole of the abdomen below the umbilical level. It was not tender on pressure, and fluctuation was very indistinct; impulse, however, being well marked. The tumour was firmly fixed. The superficial abdominal veins were considerably dilated, and inosculated freely with those of the mammæ. *Per vaginam*, the uterus was found to have been pressed high up, by a tumour behind it and in front of the rectum.

Mr. Berry tapped the patient at a point midway between the umbilicus and anterior superior spinous process of the ilium. Three or four ounces of straw-coloured fluid came away, and were followed by a discharge of pure blood. Only two and a half ounces of blood were lost, but the little patient became very weak and faint. The fluid consisted of ordinary serum with granular corpuscles.

The tumour increased rapidly, and could be felt midway between the umbilicus and ensiform cartilage; more fluid accumulated, and was removed by tapping *per vaginam*.

The patient died on March 5. At the post-mortem three to four pints of fluid escaped on opening the abdomen. The tumour was firmly fixed in the pelvis, and was glued to the intestines. It was removed along with the uterus and bladder, and sent to Dr. Wilson Fox, who found encephaloid cancer of the bladder and of posterior wall of the uterus. 'The tumour consists of a cystic portion, whose periphery is covered with cancerous nodules, and of a solid portion, from which, by scraping, a milky juice exudes. Microscopically, the closest resemblance is found between the ovarian disease and that of the other cancerous nodules. The general structure in both was that of cells and nuclei imbedded in a stroma of fibres with

large nuclei and capillary vessels. The greater portion of the juice scraped from the tumour presented nothing but free molecules and nuclei. They are round, or irregularly oval, and have an average diameter of $\frac{1}{1600}$ to $\frac{1}{2000}$ in. They have granular contents, and a clear nucleolus. In addition to these a few larger ovoid ones were seen; also elongated spindle-shaped cells, with elongated nucleus and clear nucleolus, which probably belong to the stroma or to growing vessels. Very few larger cells were seen, and these were chiefly observed in the ovary. It contained numerous nuclei, having an average diameter of $\frac{1}{3500}$, each with a bright, clear nucleolus. The diameter of the cell was $\frac{1}{800}$ in.; its walls were well defined, and its contents darkly nebulous. Cells were also seen occasionally, having a diameter varying from $\frac{1}{1200}$ to $\frac{1}{1500}$ in.; in some cases with a large, single nucleus, in others with a double nucleus. In one part of the field a body was seen which strongly resembled an immature Graafian follicle undergoing degeneration. It had an appearance of fibrillation around the whole of its circumference, certainly more than could be attributed to any thickening or folding of the cell-wall. The whole contents were rather darkly granular, but around the inner margin were indistinct traces of cell-structure, such as is seen in the membrana granulosa of mammalian Graafian follicles. It was circular, or nearly so, and had a diameter of $\frac{1}{500}$ in. In the thicker-walled cyst was contained some milky fluid; in section, the whole of the wall was found occupied with a cancerous growth.

'On section of part of the walls of one of the thinner-walled cysts, a clear, semi-transparent, not viscid fluid exuded. The walls correspond in structure with that of the thinner-walled ovarian cysts seen in multilocular tumours of the ovary. The wall was fibrous, with many spindle-shaped cells interlacing in a series of meshes and mingled with finer areolar tissue. Cancer-cells were only seen in a few places in the wall. The epithelial lining had disappeared in a great measure from the interior. (Post-mortem change?) Here and there were a few flattened cells. At the inner boundary a few swollen and granular cells are still adhering; these latter are indistinctly nucleated. At one spot a villous, cancerous growth was seen projecting into the interior of the cyst. These cysts must be

regarded as Graafian follicles in which the ovum has perished, and the membrana granulosa also been destroyed. As a consequence, they had become somewhat distended by a serous secretion, and were, at the time of observation, in the course of invasion by the cancerous growth. The relation of the cancer of the ovary to that of the other tissues must, I think, be regarded as somewhat doubtful.'

Of twenty patients, in whom I made exploratory incisions followed by drainage, eleven died within fourteen days of the operation, and nine of these had some form of malignant disease. Five of the nine recoveries were well a few years later, one died at the end of nine months, and, it may be presumed, from continuance of cancer; of three there is no further history.

TUBERCLE.

Rokitansky denied altogether the fact of tubercle being found in the ovary. Other pathologists speak of it as rare, and as generally associated with similar disease of the peritoneum and other organs. A large cyst was removed from a single lady, æt. 23, who died five days after the operation from diffuse peritonitis of a low form, probably tubercular. Dr. Wilson Fox carefully examined the specimen, and described the cyst as single, with the exception of a few scattered, thin-walled cysts on the inner surface. On the outer surface, beneath the peritoneal coat, and firmly blended with the surrounding stroma of the cyst-wall, there were numerous nodules about the size of peppercorns, of a cartilaginous hardness, appearing on section glistening and semi-transparent at the circumference, and opaque and cheesy at the centre, which was slightly softened. The nodules themselves were without any trace of vessels, but the tissue around each nodule was very highly injected, and in the injected area there were delicate false membranes studded with the finest granulations of miliary tubercle. False membranes were also seen on other parts of the tumour, containing fine granulations of miliary tubercle; and similar gray granulations, not larger than a pin-point or a poppy-seed, on some parts of the outer wall of cyst. Under the microscope, the outer part of the larger masses and small gray granulations were observed to have the

same structure, and to consist of slightly elongated cells, containing large, round, very clear, highly refracting nuclei, each nucleus containing a nucleolus. The nuclei were in some parts free. In some parts of the field, cells with two nuclei could be found; these were imbedded in a clear, separating, finely striated, and very firm inter-cellular substance. The cells averaged $\frac{1}{2500}$ in. in diameter, the nuclei $\frac{1}{4500}$. The cheesy yellow matter in the centre of the nodules consisted of oil globules, granular *débris*, and shrivelled cells. From these characters, Dr. Fox had no doubt that the nodules and gray granulations were of tubercular nature.

I have since met with several other cases in which there was tuberculous deposit in ovarian tumours.

THE PEDICLE.

For the sake of convenience, the attachment of these ovarian cysts and tumours to the part from which they spring, whether long, narrow, and cord-like, or short, thick, and broad, may be considered under the common designation of pedicle. It consists of the Fallopian tube often much elongated, the broad ligament often considerably thickened, the utero-ovarian ligament in some cases hypertrophied into a large fibroid stem, and the round ligament. The round ligament may be so convoluted that a double curve of it is included in the pedicle, but it is often quite free. Occasionally the utero-ovarian ligament and the Fallopian tube are not connected by the broad ligament; a considerable space may intervene between them, so that they appear as two pedicles to one tumour. The pedicle always contains large blood-vessels; every now and then the veins are so large and distended that they resemble the intestines of a rabbit. In all cases of ovarian tumour the arteries are branches from those which supply the ovary itself, and the veins continue to show the tortuous distribution peculiar to the plexuses of this part. The size of these vessels, when adhesions do not materially contribute to the supply of nourishment, is mostly in proportion to the bulk of the tumour, but oftentimes their volume is inexplicably large, and accounts for the rapid loss of blood when ruptured or divided. Numerous lymphatics after a devious course and many inosculations

passing between the ovary, the tube, and the broad ligament to the lumbar plexus are also inclosed in the pedicle, and nerves of considerable size accompany the vessels. I have seen a nerve quite as large as the radial in a part of the pedicle left above the clamp. The tissues mixed up with the other components of the pedicle are histologically the same as those of the coats of the tumour—a species of imperfect connective and fibrous tissues, the chief elements being single white fibres, numerous fusiform embryonic fibres, and elliptical round cells or granules, the whole being coherent and strongly contractile. All is bound together by an envelope of peritoneum reflected from its base of attachment and continuous with the expansion over the tumour. In many cases, especially where the disease assumes the colloid form, the pedicle becomes implicated, is soft in texture, and easily broken through. In others it becomes the seat of numerous proliferous outgrowths or papillary excrescences. But in its ordinary form as described, it is to a great degree extensible, and consequently is found of very variable length and thickness. When elongated, it may form attachments to the surrounding parts, and sometimes is the cause of strangulation of intestine. It is not often that it is seen so long as in Case 603, where it measured more than one foot, and was accompanied throughout by the Fallopian tube. In Case 844 it was more than the usual length, and had a band of adhesion stretching across to a coil of intestine. This I ligatured before putting on a clamp to the pedicle. There are also instances of duplicate pedicles. I need only cite two or three cases among my last five hundred. In one case (502) the pedicle was in two divisions with intestine between them. Two distinct pedicles supported the cyst in Case 927, but the tube only was tied. The patient did well, and is alive at present. In No. 841 I met with the singular complication of four cysts for which there were four pedicles, and it turned out that there were three ovaries present. A long pedicle allows free scope to the disposition which these tumours have to turn upon themselves, and is then the source of important complications.

In 1865 Rokitansky published a paper on 'The Strangulation of Ovarian Tumours by Rotation.' The tumour turns upon its axis, and the pedicle is twisted sometimes as much as two or three times round. The occurrence is not at all rare.

Rokitansky has given the particulars of thirteen cases, eight of which he found in making autopsies after fifty-eight deaths from ovarian disease. The same thing has been observed during my operations at least some eighteen or twenty times, and no doubt it has at others escaped notice. In two cases it caused death before operation.

The direction of this rotation is not at all constant; sometimes being inwards towards the median line, sometimes the reverse, outwards. The tumour may also rotate obliquely, turning over backwards or forwards. In outward rotation the Fallopian tube, if not adherent to the tumour, becomes spiral round its pedicle; if adherent, round both tumour and pedicle. In inward rotation, the first half turn pushes the tube inwards and backwards. Should the rotation continue, then the tube forms a spiral round the back of the tumour. Or it may be altogether exempt from participation in the turning. The uterus is pulled in the direction of the rotation, and in one case (106) it was so much drawn out of its place that I was led to suppose I should find close adhesions, which however did not exist. These movements seem occasionally to take place suddenly and quickly; but they are gradual in other cases; may be reversed, and recur. Where the rotation is not complete, the motion may become, as it were, slowly oscillating. The pedicle sometimes gives indications of these changes having taken place repeatedly or habitually; and general symptoms, such as sudden accession or increase of pain, change of other sensations from altered relative position of the tumour and viscera, and perhaps some difference in the external contour of the belly, may enable us to conjecture the time of their commencement.

But if the rotation has taken place, and the pedicle has become twisted, and no unwinding of it follows, what may be the consequences? The great veins are compressed, and blood continues to pour in by the arteries. Congestion, exudation of serum, extravasation of blood into the cysts, and rupture follow in rapid succession, and, unless timely relief is afforded by ovariotomy, the patient soon sinks. If the rotations are so complete and enduring as to strangulate the arteries of the pedicle, gangrene is inevitable. But supposing the revolving of the tumour to be accomplished more tardily, nutrition is

only impeded, and the more happy result of shrivelling of the walls of the tumour, with absorption of the contents, occurs. The remains of such tumours have been found sometimes in Douglas's space as a hard, solid, partly cartilaginous substance. Inflammatory adhesions binding down the pedicle have also, without twisting, brought about the atrophy of an ovarian tumour. In other instances, the constriction of the vessels by the change of position is so moderate that the tumour itself is not much affected, but it remains stationary, and contracts adhesions to some of the viscera, and cannot be replaced. Rokitansky mentions one case in which a strong cord-like band so ligatured the sigmoid flexure of the bowel that the slightest change of position rendered it impermeable. The bowel has also got so entangled with a long pedicle, during rotation, as to become strangulated. The immediate performance of the operation of ovariotomy might even be rendered necessary, under such circumstances, for the release of the compressed and obstructed intestine. Even after new vascular alliances have been formed between the rotated tumour and the omentum or viscera, the pedicle has by some means, either tension or pressure, been divided. In such a state of transplantation, the tumour has drawn its nutriment through the newly formed vessels of the plastic adhesions, and its parasitic existence has not been much less vigorous than before. Several examples of these self-grafted tumours have come under notice among my ovariotomies. In the operation in Case 110, performed in November 1864, the incision extended from two inches above the umbilicus to five inches below it. There was no adhesion to the abdominal wall, but the omentum was strongly attached to the upper part of the cyst, and interlaced with mesentery from below. I tapped several large cysts successively, got the tumour out, and then found there was no pedicle. It appeared that the tumour derived its vascular supply solely from the omental and mesenteric vessels. The fundus of the uterus felt rough, but there was no tear nor fracture at the point where the Fallopian tube must have separated, nor was there any bleeding; there was pretty free hæmorrhage from the omental vessels. I cut away some shreds of omentum, and tied at least twelve vessels with very fine silk, cutting off both ends of the ligatures close, and

returning the omentum with the tied vessels into the abdomen. The other ovary was found in its natural position, but enlarged and diseased. It too was removed, and the patient was soon fully re-established in health, and lived till the year 1878. Another instance (Case 419) was that of a married woman with five children, thirty-eight years of age, whose mother died of dropsy with abdominal tumour. For eighteen years and through all her pregnancies she had carried a dermoid cyst. When two months advanced in pregnancy (May 1871) I operated on her without hindrance to the gestation. The tumour being dermoid, its contents would not pass through the trocar, but gushed out from the puncture. The cyst was then drawn out, large shreds of very vascular omentum and a coil of intestine growing to it. On separating the omentum and intestine, it was found that there was no pedicle. The blood supply of the cyst had been kept up by the omental vessels, and some large vessels near the cæcal appendix, where the intestine appeared thick and contracted. Several vessels and shreds of omentum were tied, and returned with the ligatures cut off short. At the full term of pregnancy a living child was born after a natural labour in December 1871. She was well in 1872, but this year suffers from pulmonary disease.

It is very easy to understand that an ovarian tumour of almost any size, provided the pedicle be not short or broad, and the tumour be free from adhesion, may very easily rotate and form one, two, or more complete twists of the pedicle. I have several times unrolled the pedicle before applying a clamp or ligature, turning round the tumour three or four times before it was set right—this although there had been no such stoppage of the supply or return of blood as to have affected in any remarkable degree the nutrition or appearance of the tumour. But in other cases, the veins having been compressed while the arterial supply went on, successive hæmorrhages have taken place. I have twice known sudden death so caused. I once went with the late Mr. Fowler, of Kennington, to operate upon a lady at Brixton, when we found that she had died unexpectedly two hours before our arrival. The post-mortem examination showed that death was due to a very large extravasation of blood, first into the ovarian cyst and then, after its bursting, into the abdominal cavity, evidently the consequence of a complete

twist of the pedicle by the rotation of a non-adherent cyst. In another case I went to the Hospital for Incurables at Putney to see a patient there by the desire of Mr. Cream. She had been found dead that morning by the side of her bed. Though against the rules of the Institution, I opened her abdomen and removed a large free ovarian cyst, which contained more than five pounds of blood-clot, the bleeding in this instance also caused by a long twisted pedicle. These are the only two cases of sudden death I have seen, but I have many times known hæmorrhage to a smaller extent lead to attacks of pain, vomiting, and imaginary peritonitis; and more than once such extreme pallor or chloro-anæmic aspect as gave rise to ungrounded fear of malignant disease. One very remarkable case of this kind was a lady from Moscow, who arrived in London, May 1879, after a journey which was interrupted at Berlin by an attack of severe abdominal pain and vomiting. She was twenty-four years of age, married in January 1873, had her first child in November of that year, aborted in 1875, 1876, and 1877, and gave birth to a second child in October 1878. In 1876, before the second abortion, she observed a tumour the size of the fist on the left side of the abdomen. After the abortion it increased to the size of a child's head, and so remained during the subsequent pregnancies. The last labour was natural, but the abdomen continued to enlarge until she left Moscow for England to consult me. She was detained a week in Berlin by the symptoms above noticed, attributable, I believe, to a twist of the pedicle, and on reaching London she was suffering from a recurrence of pain and vomiting. She was extremely weak, and so very white and bloodless that, fearing no time was to be lost, I operated after she had been three days in London, and found, as I expected, a quantity of blood-clot within a very rotten cyst, and a narrow cord-like pedicle so tightly twisted as to be almost broken off. There was no fetor. Extensive recent adhesions to omentum and coils of intestine had mainly kept up the supply of blood to the tumour of the left ovary. The right ovary being enlarged and cystic was also removed. The patient recovered without any fever, soon regained her colour, and not long since sent me a coloured photograph portrait to show the difference between her striking pallor before the operation and her present look of blooming health.

The generality of sessile tumours, extra-ovarian and extra-peritoneal, have no true pedicle, but acquire their supply of blood by numerous vessels entering at all the attached parts. Some of the extra-peritoneal, however, in enlarging from their base, drive the peritoneum before them. This then makes a band or cord of connection, and may or may not contain a few large vessels, but does not assume the form of a substantial stem as in the ovarian cysts. I count as many as nineteen cases of enucleation, or no pedicle, among my last five hundred ovariotomies. And so long ago as 1859, when relating the history of my third case, I pointed out the existence of pedunculated extra-peritoneal growths. Mr. Jardine's description of what was found on examination is printed at page 51.

DEGENERATION OF CYST WALLS.

Ovarian cysts, and more especially the complicated kinds, are liable to become inflamed, either spontaneously or as the consequence of some accident or operation, such as tapping. The disease may run on rapidly, with intense symptoms and general peritonitis, to a fatal termination. Or it may be more localised and lead to suppuration in some cavities. This may go on for some time, with the production of pus as in a common abscess, or the contents of the cysts may be converted into any of the foul, offensive fluids, the result of decomposition. The fatal termination, if the cyst be not removed, may be due to diffuse peritonitis, but more commonly to septic or pyæmic fever, the result of blood changes set up by absorption, or by admixture, more or less direct through the vessels of the cyst, of the putrid fluids or gases with the blood. In other cases ulcerative action in the walls takes place: they thin, give way, and are perforated. The point of perforation may be free, and allow the escape of the contents into the abdominal cavity, followed either by speedy death or by chronic peritonitis. But if adhesions have glued the cyst to the abdominal walls, they too may be subject to the same destructive action, and a fistulous opening will be formed through them. At other times the adhesions have been between the cysts and some of the viscera. The uterus, vagina, bladder, and rectum are sometimes the route by which dis-

charge takes place; and in a few rare cases it has happened through the attached Fallopian tubes. When perforation has taken place into the bladder or rectum, sinuous fistulous channels are formed, and suppuration may continue for some time, with free discharge of the pus by the natural outlets. But the end of this, if not, as in some rare case, a spontaneous cure, is either death by pyæmia, or equally fatal exhaustion.

In some instances where the cyst walls have contained bones, their sharp points and angles have caused the giving way of the tissues; and sometimes the other accidental formations of a dermoid cyst have found their way into other cavities, generally into the bladder. Diffenbach had to perform cystotomy for the removal of a piece of bone which thus passed from an ovarian cyst into the bladder. Perforation may also take place in another way, as a consequence of the slower degenerative processes going on in the walls of the cysts. The contents accumulate inordinately; the vessels are pressed upon and constricted or obliterated; the blood supply is diminished; thinning of the wall stroma takes place, and the changes of involution set in. Spontaneous rupture, as it is called, occurs; and when the fluid simply rushes into the abdomen, death is the usual consequence of the induced peritonitis. Yet cases of cure have been met with by many surgeons. Oppolzer, Kiwisch, Ulrich, and others have recorded instances of such recovery.

In several of my cases of ovariotomy the operation was performed after the cyst had burst and its contents had escaped into the peritoneal cavity. The peritoneum has been found intensely red, thick, soft, or villous, and occasionally covered by loosely adherent flakes of lymph. Yet the result has been surprisingly satisfactory. The irritating cause having been removed, the irritation has subsided. If the cause had not been removed, death must have happened at no distant period, as all the general and local symptoms of chronic diffuse peritonitis had, in the whole series of cases, followed the rupture. In the last series of 500 there were twelve instances of burst cysts before operation with only one death, 2·4 per cent. At any rate, the bursting of the cyst, or the filling of the peritoneum by oozing from the puncture made by tapping the cyst, is no bar to the operation of ovariotomy, but rather a reason

for doing it without delay. The fluids found in the peritoneal cavity have been of all kinds—simple, bloody, and fetid; the cyst walls in all stages of degeneration, some even nearly black, with ragged edged openings; and the peritoneum always with the same signs of inflammatory action, though, perhaps, in the fatal cases the semi-organised lymph patches were more general.

To illustrate this point in the history of ovarian pathology, it may be well to cite some notes of Case 200, which is a type of all the rest. This patient was a lady, thirty-seven years of age, mother of six children, whom I saw with Sir Thomas Watson and Dr. A Farre in 1866. I had previously removed an ovarian tumour from a daughter of her mother's sister, and have since done the same for another patient, the daughter of another sister of her mother, thus making up a series of three cousins, children of three sisters, none of whom have ever shown any sign of the disease—a curious fact in relation to cystic pathology. An ovarian tumour and vaginal cystocele were recognized, and twenty-three imperial pints of fluid were removed by tapping. The fluid rapidly formed again, and I removed the cyst two months after the tapping. Twenty-six pints of ovarian fluid were free in the peritoneal cavity, and a thin-walled multilocular cyst, which appeared to be a simple hypertrophy of the normal constituents of the left ovary, and weighing only two pounds, was taken away. When all the fluid was sponged from the peritoneal cavity, Dr. Farre and I were both struck with the intense vivid redness of the membrane. It was thick, soft, velvety, not obscured by any exudation of lymph, but all over the abdominal wall, the intestines, and uterus, it was as brilliantly red as a microscopical injection. We were naturally apprehensive of the effect of the incision, sponging, and action of air upon a serous membrane in this condition, and I went directly after the operation to tell Sir T. Watson. He said, 'Are you sure you got it all out?' When I answered, 'Yes, quite sure,' he replied, with the wisdom of a great clinical teacher, 'Then let us hope, as the irritating cause is removed, the irritation will subside.' And it did subside. There was no bad symptom. Recovery was complete. She had her seventh child born thirteen months after the operation, and has had another since. Of the many

valuable practical lessons for which I am indebted to Sir Thomas Watson, I know of none more important than that he taught in this case. It has been a guide in many others since ; and when able to remove an 'irritating cause,' I have almost always found that the irritation has subsided.

In these cases, the common form of degeneration is that into fat. This, indeed, is the most commonly observed stage of retrograde change in these tumours, the primary one being that of an anæmic condition of the fibrous tissue. There are very few ovarian cysts in which it is not seen to some extent. Here and there are found yellow or light brown patches slightly raised above the general level, with a fatty or lardaceous deposit in the cells of the areolar tissue. This often begins in the epithelial lining, and spreads to the adjacent tissues, involving and pervading sometimes the whole thickness both of walls and septa. In this way, the septa yielding to pressure of the contents, small cavities unite to make large cysts, and large softened cysts burst without ulceration.

The wall of a multilocular ovarian cyst of very rapid growth, taken from a young unmarried Jewess (Case 153), displayed several irregular patches of a dull yellow or brownish colour. On examination by the microscope, the patches in question were found to consist principally of white fibrous tissue, but no traces of fat could be detected. The colour was probably due to non-vascularity, the patches being deprived of a vascular supply, owing to the vessels being filled with clot, and being more or less obliterated. The non-vascularity of the patches was due to congestion of the vessels in the immediate neighbourhood, resulting in rupture and extravasation. The cyst wall as a whole was beautifully injected with blood, the portions surrounding the patches only showing extravasation. The extravasated points formed two circumvallated lines, as shown in the accompanying woodcut.

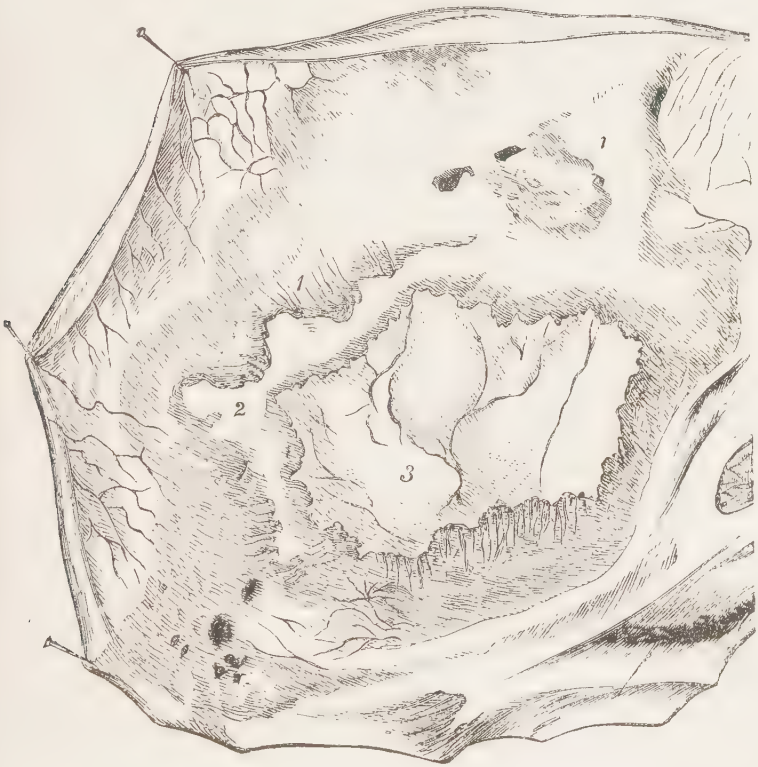
The vessels leading to the outer circumvallation were large and numerous; those leading to the inner circumvallation being smaller and fewer in number. The patches, with the circumvallated lines, may be said to form three distinct areas:—

1. An area where the vessels were numerous and large, and where great quantities of blood of a bright florid colour were effused.

2. An area where the vessels were smaller and partially emptied of their contents, and where the effusion was less highly coloured and less distinctly marked.

3. An area in which the remnants only of vessels could be traced, and where no effusion was perceptible.

This third or central area was of a dull yellow, running into a dull brownish tint, and contrasted strongly with the delicate hue of the second area.



These appearances are described as seen from within the cyst wall.

That portion of the cyst wall corresponding to the non-vascular area varied in thickness, and not unfrequently became extremely thin; and when the cyst ruptures, it is at the points indicated.

The further stage of chalky metamorphosis is simply the exchange of the lardaceous deposit in the tissues for that of calcareous matter—a condition quite distinct from that of ossification. This chalky deposit sometimes extends through a large part of the walls of some of the cysts, and makes them rough, uneven, and easily broken. The superficial plastic deposits thrown out upon the peritoneal surface and its adhesions give a temporary respite from rupture in some of these cases.

CHAPTER II.

DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS

Many of the signs and symptoms of the ovarian tumours classified in the preceding chapter are common to the whole group. The outward manifestations and the inward effects are nearly the same. There are degrees of hardness and mobility; there are shades of force and sharpness in fluctuation; there are eccentricities of form and variations in relative position which in different cases alter the areas of resonance and dulness. But the physical signs, though often sufficient for diagnosis, are sometimes far from conclusive till we come to test the contents. With them we obtain additional evidence, and are able to declare in certain cases from what sort of cyst they are drawn.

The symptoms of the tubercular, and what are called malignant tumours, are a set apart. With the cystic enlargements, simple and compound, there are from the first progressive uneasiness running on to distress, pain from nerve pressure and stretching, irritation from local congestion, and other effects purely arising from mechanical causes. But as the tumour grows bigger and encroaches on the various organic territories, functions are interfered with and suspended, the lines of innervation are cut or compressed, circulation and absorption are interrupted, nutrition is arrested, and the victim dies atrophied and suffocated under a veritable 'peine forte et dure.' The evidence from mere symptoms is all along more circumstantial than specific, and assists rather in forecasting the end than in identifying any particular kind of cyst.

No time of life is exempt from ovarian tumours. They are found in infancy as well as in extreme old age, though it is seldom that the development begins late. When seen in advanced life they are generally examples of longevity of the tumour no less than of the person. The greater part of my patients have come to me between the ages of twenty-five and

fifty-five, and the average age of those on my list of 1,000 cases of completed ovariotomy is as near as may be thirty-nine. This would seem to show clearly that the condition of the generative function has a great deal to do with the origin of the disease. What Boinet says about childless women, that 'sur 500 femmes atteintes de kystes de l'ovaire nous en avons trouvé 390 qui n'avaient jamais eu d'enfants,' points either to a cause or a consequence, and certainly to some connection between the two facts.

It has been said that the ovary of the right side is more frequently affected than the left. There is no proof that it is so, and the statement is rather one of impression than of assurance. Both ovaries are often found diseased at the same time in different degrees. With this evidence of sequence and with our knowledge of the almost inevitable correlative sympathetic morbid action between twin organs no question can be made as to the rule of practice, as accepted in ophthalmic surgery, to save one by cutting out the other; while it may be as wrong to cut out a sound ovary as a healthy eye.

A long duration of the disease is exceptional, and race and type yield equally to the same etiologic influences. M'Dowell soon fell upon cases among negresses as well as whites. My list is multicolor and cosmopolitan, and, if reports may be trusted, ovariotomists whether they date from Nova Zembla or New Zealand are never in want of subjects.

DIAGNOSIS OF THE DIFFERENT KINDS OF OVARIAN TUMOURS AND THEIR ADHESIONS.

The discovery of a tumour in the abdomen is generally made by the patient herself. The question, What is it? is one for the surgeon. Having satisfied himself that he has an ovarian tumour to deal with, and putting aside the tuberculous and cancerous degenerations which are indicated by the general conditions, to him the points of primary importance are its seat, solidity, and relative freedom. He has to make out, if possible, the basic origin of this tumour, and what sort of pedicle it has, on which side it is attached, and whether it be single or double. It is possible that there may be a cyst of both ovaries, one on each side. This I saw for the first time in

a young lady whom I attended with Dr. Priestley. There was a distinct sulcus between the two cysts near the median line, and it became a question whether this was owing to disease on both sides or to the peculiar shape of a cyst on one side. It was supposed that the latter opinion was more probably true, because the catamenia were regular; but at the operation two free simple ovarian cysts were removed without difficulty. In one case the appearance leading to suspicion of both ovaries being diseased, depended on a deep sulcus in the cyst caused by the rotation of the tumour and the pull on the Fallopian tube. If the resonance of intestine can be distinctly traced low down in front between two cysts, the probability of ovarian disease on both sides is strong.

The next questions are whether the tumour is cystic or solid, or whether it is free or adherent; and if adherent, whether the adhesions are of such a character that they may be separated without risk, or so extensive and intimate that separation would be almost certainly fatal. On their solution depends the decision whether tapping should or should not be recommended according to the probability of relief from it; whether drainage should be tried, or whether ovariotomy would be the best practice; whether this operation could be done with more or less than the average chances of a good result; or lastly, whether the difficulties would be so great that it should not be attempted even if the patient were herself anxious thereby to escape from her sufferings whatever the risk might be.

The solid tumours of the ovary are excessively rare. In two of the cases which I have seen, the tumours were surrounded by fluid free in the peritoneal cavity, and it was only after removal of this fluid that the size and consistence of the hard body could be made out. Solid portions of large tumours which fluctuate in other parts are common enough, but general hardness and irregularity of form, with nodular masses cartilaginous or bony to the touch, almost indicate the dermoid character of the growth, especially in a fair and young patient.

When by internal and external examinations the outline of the tumour can be traced smooth and elastic over its whole surface and extent, when the wave of fluctuation is equally perceptible in all directions and sharply limited by the line of dulness on percussion, and the want of resonance is definitely

circumscribed, the inference is pretty clear not only that the tumour is cystic, but that it is practically unilocular.

This simple cyst, however, may be either ovarian or extra-ovarian. If in a young person it is either flaccid and of long duration, or excessively tense and of recent formation, the inference is almost equally clear that the cyst is extra-ovarian and the contents limpid. As this kind of cyst especially may be not only temporarily emptied, but emptied with the probability that the fluid will not collect again, it is interesting to ascertain if possible whether it is really single or whether there may be one large cyst with smaller ones concealed. Two conditions may be accepted as proof that an extra ovarian cyst is simple: first, that it has lasted for many years with very little damage to the general health; or secondly, that it has formed with such rapidity as to be almost certainly mistaken for ascites. In the first of these two conditions the cyst is generally flaccid, and there is little or no suffering beyond the inconvenience arising from its bulk. In the second, the cyst is excessively tense, and there is all the suffering which accompanies undue and sudden abdominal distension. Both are very likely to be pronounced ascites, but may of course be distinguished by the signs of the inclosure of the fluid in a cyst, enumerated in another part of this chapter.

With these simple cysts, whether of the ovary or not, the health is for some time but little affected. The first appearance is in much the same spot, the advance is similar, the form of the abdomen and the effect of change of position are not different. The fluctuation in both is limited, but to the touch the shock is not the same. It is as distinct in the one as in the other, but from the character of the fluid and the thinness of the walls in the broad ligament cysts, the wave impression under percussion in them is more defined. Scarcely a trace of these tumours can be felt after tapping, so completely do the walls collapse. The fluid itself, in contrast with that from an ovarian cyst, is thin, clear, odourless, and any coagulum formed by boiling is redissolved by boiling acetic acid. On this test the practitioner may mostly rely with safety, and found a reasonable hope that further proceedings will be unnecessary.

There are many cysts which, although practically unilocular, have on some part of the wall of the mother cyst, most com-

monly near the base, a group or groups of secondary cysts, which negative the supposition that the tumour is extra-ovarian, and the contents instead of being limpid will in many instances prove to be viscid. Multilocular cysts are sometimes as uniform in outline as simple cysts, but as a rule their surface is more or less irregular from the unequal development of their component parts; and the projection of the different compartments can be both felt and seen. These projections vary in hardness, and when the resistance of the cyst wall to pressure is very considerable, when the fluctuation is limited by the divisions between the cavities, and its wave is slow and doubtful, the probability is that the cyst wall is thick and the contents colloid. A septum must be very thin which does not intercept the wave of fluctuation, but in some cases of colloid tumours, where the septa are imperfect, the impulse of the percussed fluid is almost as distinct and instantaneous as in a true unilocular cyst.

Boinet believes that the colour and consistence of the contents of multilocular cysts may be predicted before tapping. The progress of the disease, the more or less acute pain, the signs of inflammation more or less acute and repeated, and the state of the general health, will be sufficient to indicate if the contents are serous or purulent, and what their colour may probably be. When abdominal pains have been frequent, and the abdomen is tender on pressure, it is probable that, whether the cyst is unilocular or multilocular, the contents will be reddish, sero-sanguinolent, or resemble coffee or chocolate. When the temperature of the patient is high, ranging from 100° or 101° in the morning to 103° or 104° at night, and emaciation is progressive, appetite lost, thirst troublesome, sleep disturbed, nausea or vomiting distressing, and the abdomen tender on pressure, with hurried pulse and respiration, it is extremely probable that one or more of the cysts may contain pus; and that, when these symptoms are present in an extreme degree, or have lasted for a considerable period, the pus has become fetid. Blood may be found in one or more of the cysts, either as an immediate result of twisting of the pedicle, or as a more slow and gradual oozing from the degenerative changes which have been described.

When any considerable amount of blood has been poured into the cavity of an ovarian cyst, all the well-known signs

of internal hæmorrhage are necessarily observed. I have twice seen sudden death occur in this way. In one case five pounds of blood and clot were removed from the cyst into which they had been suddenly poured in consequence of the giving way of a large vein, which ran along the lining membrane of the cyst. In the second case the blood passed into the peritoneal cavity. Another patient died, but not immediately, of bleeding through the Fallopian tube and uterus from a large cyst of the left ovary.

ADHESIONS.

In the early days of ovariotomy great pains were taken to ascertain whether a tumour was free or adherent, and, if extensive adhesions to the abdominal wall were believed to exist, ovariotomy was considered to be improper or impracticable. Mr. Walne, in 1843, began his operations with a small incision just large enough to enable him to ascertain with his finger whether the cyst were free or not. Dr. Frederick Bird published a great number of cases in which he made an exploratory incision and abandoned the operation as soon as he found that the adhesions were intimate. He was so anxious to ascertain the presence or absence of adhesions that, even before making an exploratory incision, he used to insert needles through different parts of the abdominal walls into the cyst, believing that by watching the movements of these needles, as the patient inspired and expired, he could make out whether the cyst shifted its place beneath the abdominal wall or not. Others marked the deviations of the canula after tapping, with the same intention and belief, only to find that all these signs were fallacious. Before I had operated on any considerable number of cases, I began to doubt whether cystic attachments seriously affected the result of the operation, and, as soon as the number of the cases of ovariotomy could be reckoned by the hundred, it became very clear that, although adhesions to the abdominal wall might lead to some little delay and difficulty in detaching the cyst, to some trouble in closing bleeding vessels, and to some care in sponging out any effused blood from the peritoneal cavity, yet that the statistical results were absolutely identical whether the cysts were fixed or loose.

Practically, therefore, in deciding whether ovariotomy

should be recommended or not, adhesions to the abdominal wall may be almost disregarded. Still, it is a matter of some interest to know what are the signs by which a free or an adherent cyst may be pretty certainly recognized. To make this examination the patient should be placed in a good light, lying on her back, with the shoulders and knees somewhat raised, and the whole abdomen uncovered. By watching the abdominal movements during deep inspiration and full expiration, a free ovarian cyst may be seen, providing the abdominal wall is not too thick, moving upwards and downwards with every breath. Irregular elevations and depressions on the surface of the cyst make its free mobility perfectly manifest and indubitable; but when the surface is uniform it is only the upper border of the cyst which can be seen to move, and to avoid deception it may be necessary to ascertain by percussion how high the outline extends above the umbilicus, because the transverse colon, following the respiratory movements, may be easily mistaken for a moving cyst. A thick abdominal wall may obscure the movements of the cyst during inspiration and expiration, but it is quite easy to follow them by the varying position of the dull sound of the cyst and the clear sound of the colon under percussion.

The dull sound at the upper boundary of the cyst will often descend from one to two inches during inspiration, and rise during expiration, just as the cyst is seen to move in patients where the abdominal wall is thin. With close adhesions to the abdominal wall no such freedom of motion can be observed, nor is it possible. The cyst and the abdominal wall must move together unless the adhesions are loose. I have three or four times seen cases where the cyst moved freely beneath the abdominal wall, but in which very firm adhesions had to be separated, these adhesions consisting of flattened cellular bands or cords of fully an inch in length. My belief is that such bands of adhesion have been elongated by the free motion of the cyst before the lymph forming the connection had been thoroughly organised or hardened. Once aware of this source of fallacy, it is easy to check it by placing the hands flatly over the abdomen while the patient breathes. If the cyst be really free no crepitus will be felt, whereas any long bands of adhesion give a sensation of grating or crackling to the hand, which can only

be mistaken for the rubbing of recent lymph, or for the presence of omentum in front of the cyst. With this sensation of crepitus, friction sounds are always audible, and the concurrence was formerly supposed to be an evidence of adhesion by lymph recently effused upon the peritoneal surface of the cyst or upon the peritoneum in apposition with the cyst. But this is certainly an error. So long as the friction can be felt or heard, movement must be free. As soon as adhesion takes place friction ceases, and can only be felt again if the lymph which forms the connecting medium becomes so stretched that motion again becomes possible between the cyst and the abdominal wall. It is quite common for crepitus to be present for a time, and to disappear without any adhesion, the lymph being removed and the surface of the peritoneum again rendered smooth. The crepitus which is produced by the presence of omentum between the cyst and the abdominal wall may be mistaken for that caused by recent lymph or old stretched adhesions, but it is not impossible to distinguish them with tolerable certainty. With omentum there is a softer and more doughy feel, and it is seldom present over any part of a cyst not near some intestine. This is easily recognized by its resonance on percussion and its gurgling under pressure, and there is neither the tenderness nor general feverishness which accompany the recent effusion of lymph.

This interesting point in the diagnosis of adhesions presented itself in the case of an unmarried girl, eighteen years of age, sent to me some years ago by Dr. Whitehead, of Manchester. Her tumour, which had not been tapped, was observed to move very freely beneath the abdominal parietes on deep inspiration, and I therefore expected to find it non-adherent. But at the operation on June 13, 1864, very firm adhesions anteriorly and in the right iliac fossa, sufficiently long to admit of the cyst moving freely, and a very extensive surface of adherent omentum, were separated by the hand with some difficulty, and a close adhesion to the fundus of the bladder required careful dissection.

The action of the recti abdominales varies with the different conditions of ovarian tumours, and should be brought into view by directing the recumbent patient to try and sit up without assisting herself by her hands or elbows. This effort puts the

recti upon the stretch, and if a tense ovarian cyst is free from adhesion, it falls backwards and to the sides, while the muscles form a projecting ridge in the centre of the abdomen. The same appearance is seen in cases of adherent cyst only when it is flaccid or partially empty.

The umbilicus is not affected by the movements of a free ovarian cyst during respiratory action, or when pushed in various directions. But any movement communicated to a cyst which adheres to the front of the abdominal wall is immediately followed by a corresponding movement of the navel.

But while adhesions to the abdominal wall are less regarded in ovariotomy, adhesions low down in the pelvis are on the contrary of great importance. The difficulty is to separate them without serious injury to the rectum or the bladder, or the ureters, or to large blood-vessels or to nerves, and it is not easy to find every bleeding vessel or to stop the loss of blood. When deep seated and very intimate, the dissection necessary is out of the question in the living patient and gives no small trouble after death. Such a condition may be always suspected or rendered almost evident, especially after tapping, when placing the patient on her elbows and knees, with the pelvis raised and the thorax depressed, the lower portion of the tumour can be felt unyielding by the finger through the vagina or rectum, and the uterus is found either pulled up out of reach or pressed backwards or forwards or to either side while its mobility is considerably restricted.

But it is quite possible that the lower portion of an ovarian tumour may be jammed downwards and moulded into the pelvis without becoming attached. Then in the same position some force with the finger will dislodge it and show that it is not bound down by adhesions. I have operated on an ovarian tumour thus simply impacted in Douglas's space with the uterus thrust upwards out of the pelvis. Both ovaries were diseased, and though there were no adhesions one cyst was prevented from rising by the other. They were successfully removed. It is curious in such cases to hear the rush of air into the hollow when the lower portion of the cyst is pulled away from the sacrum. The air passes down with a gurgling sound, and the tumour is brought away with no more than the ordinary difficulty.

Adhesions to the liver, stomach, or spleen can never be

accurately made out before operation. Sometimes a coil of intestine can be distinctly traced, always remaining attached to the same part of the cyst wall. Further than this, adhesions to the abdominal viscera can only be ascertained after the operation has been commenced.

DIFFERENTIAL DIAGNOSIS OF OVARIAN TUMOURS.

When a woman with enlarged abdomen comes under medical examination, the three inevitable questions rise up for determination: 1st. Has she an ovarian tumour, or is it something else which can give rise to the same symptoms and appearances? 2nd. If she has an ovarian tumour, of what kind is it, and how can we distinguish one kind from another? and 3rd. Are there any other abdominal conditions and diseases of enlargement coexisting with it and disguising its identity, modifying its progress, or influencing our views as to its treatment?

The first point therefore which has to be considered in studying a case of abdominal swelling, is the organ from which it arises. The presumption being on the side of an ovarian tumour from the existence of a certain set of signs and symptoms, the probability of its being simulated by some other disease has to be discussed. And there are many conditions, some morbid, others natural, which may give rise to doubt and difficulty in coming to a decision; though these diagnostic puzzles vary much in force according to their nature, the conditions under which they offer themselves, and the amount of experience and tact in the investigator.

After the following enumeration of the principal states and diseases which may throw doubt on the diagnosis of a case of ovarian tumour, or for which it may be mistaken, I shall proceed to the separate consideration of the most important. In connection with the peritoneum we have—

Ascites,
Encysted dropsy of the peritoneum,
Tympanites and phantom tumours,
Fibro-plastic tumours of peritoneum,
Fatty tumours of omentum and mesentery,
Hydatids,
Cancer and tubercle.

Difficulties in diagnosis caused by uterine enlargements arise from—

Pregnancy,
Retained menses and moles,
Air and fluids in uterus,
Fibroid tumours,
Cancer.

Another miscellaneous group is this—

Hypertrophy of the abdominal wall,
Enlargements of other viscera, such as the liver, spleen, and lumbar and mesenteric glands,
Hydatid cysts of the liver, gall-stones,
Movable kidney and cysts of the kidney,
Fæcal accumulations,
Distended bladder,
Hæmatocele,
Pelvic abscess,
Extra-uterine pregnancy,
Enchondroma, or encephaloid disease of ilium or vertebræ.

Many of the evils and discomforts which accompany the progress of a case of ovarian tumour arise no doubt from its mere mechanical interference with the organs in the chest, pelvis, and abdomen—displacing and compressing them, impairing their nutrition, and disturbing their functions. But the pressure of the gravid uterus is as great, or even greater, and a woman in pregnancy has sometimes to endure annoyances or even real miseries. Still the process is natural, and there are compensations in the shape of local adjustments, and temporary accommodating changes of form, and mental considerations, and moral influences, which are wanting to the victim of ovarian disease. Instead of being cheered by the hopes and aspirations of maternity, she has to bear the torture of suspense or despair; her blood is impoverished, and her nervous system shattered by imperfect assimilation; and one is justified in more than suspecting a local protesting resistance to the growth of the invading tumour. After a time, the emaciation, always going on, and the weary, ceaseless self-

watchings, made inevitable by the incapacity to use healthful exercise or to undertake the usual occupations with success, chisel out the features into the peculiar pinched expression which has been described as the *facies uterina*, but which would probably be better named *facies ovariana*.

The drawing, which is an exact copy of a photographic portrait (by Dr. Wright), gives a very correct idea of this peculiar physiognomy. The emaciation, the prominent or almost uncovered muscles and bones, the expression of anxiety and suffering, the furrowed forehead (not sufficiently marked in

the drawing), the sunken eyes, the open, sharply defined nostrils, the long compressed lips, the depressed angles of the mouth, and the deep wrinkles curving round these angles, form together a face which is strikingly characteristic.

The tumour begins to grow on one side, where it occupies space wanted for the large intestine with its accumulations, and no provision is made, as for the uterus, for its expansion or for the due maintenance of its relative position in respect to the viscera. All is irregular and wrong. At first the weight makes it settle down into the pelvis, where it causes irritation

of the bladder and rectum. Mounting higher with augmenting bulk, the large intestine, according to side, gets jammed, and the fæcal matter impacted; the uterus is displaced, thrust down, or to one or the other side, retroverted or anteverted; and, as the case advances, is sometimes dragged up by its attachments so as to be out of reach of the finger in the vagina. Its form is distorted, and its functions rendered difficult and painful,

though not absolutely impossible; for, as it has been already seen, there are many coincident cases of even successful pregnancy. The urinary organs seldom escape at any stage of the disease. When the pressure is on the bladder, micturition is either troublesome, impossible, or distressingly urgent. With strain upon or pinching of the ureters, there may be stoppage of the flow of urine, or suspension of its secretion, or poisonous reflux into the system. Even the kidneys may be flattened and almost annihilated. The vital organs in the chest suffer in many ways, and the chest symptoms of oppressed action are often among the most tormenting. Œdema, ascites, and

pleural effusion, especially on the right side, occasion the greatest aggravation of misery; and the effects of distension upon the ribs and spine are so opposed to readjustment as to amount to serious hindrance to recovery after tapping. More than once the ribs, which have been thrown out like a fan, with the intercostal structures overstretched, have never returned to their normal condition; the lungs, which have been confined to a very small space, had so far lost their resiliency that air could not easily expand them again; or the pleural cavities, filled with fluid, have not been freed by absorption, or the lung has not expanded after tapping, and the patient has died from want of breathing power. Occasionally the same difficulty has been met with after ovariotomy, and a patient in whom repair has gone on well so far as the abdomen was concerned has had her recovery greatly retarded, or has died simply in consequence of the state of her chest. The two accompanying copies of photographic portraits show well how limited the breathing space sometimes becomes in consequence of the excessive growth of the tumours.

DIAGNOSIS BETWEEN OVARIAN DROPSY AND ASCITES.

Our senses of sight, touch, and hearing are all required to assist us in distinguishing ascites from ovarian dropsy, the

physical diagnosis being established—1, by inspection and measurement; 2, by palpation; 3, by percussion and auscultation; and 4, by chemical and microscopical examination of the fluids.

I. *Inspection.*—The *size* of the abdomen is seen to be increased both in ascites and in ovarian dropsy; and, when an ovarian cyst is large, the abdominal enlargement is general, as it is in ascites. But while the cyst is of moderate size, the abdominal enlargement is often partial, more to one side than the other, more below the umbilicus than above.

In *form*, the flanks and sides of the abdomen protrude in ascites, the front not being more convex than in the natural

state, or it may be flattened: while in ovarian disease the bulging is generally most evident in front, less so at the sides, and often more on one side than the other. When the different portions of a multilocular cyst can be seen, of course all doubt is dispelled, but these remarks apply to simple cysts only. Alterations in position generally produce a greater and more immediate change in the form of the abdomen in ascites than in ovarian disease, the free fluid gravitating much more readily than a cyst can move. The normal depression of the *umbilicus* is altered whenever the general abdominal enlargement is considerable both in ascites and ovarian dropsy; but in the latter disease, although it may be flattened as in preg-

nancy, it is only prominent and bulging as it very often is in ascites, or when ascitic fluid surrounds an ovarian tumour, or when there is an ordinary umbilical hernia also. The *superficial veins* may be dilated from the lower part of the abdomen to the chest, on one or both sides, in either disease. This varicose state of the veins only assists in diagnosis when much more evident on one side than the other. Such undue importance has been given to this vascular condition as a distinction between ascites and ovarian dropsy, and between simple and malignant tumours within the abdomen, that the following facts should be recollected :—

The appearance of congestion of the epigastric veins, seen merely as a fine network of capillaries, is usually a simple result of absorption of the cutaneous fat, the vessels becoming visible through the thinned and distended skin, and has no diagnostic value. When some of the larger veins, distended or varicose, in their course from the inguinal region upwards, either cease abruptly in the middle of the abdomen, or run to the hypochondriac region, or even up to the clavicles, anastomosing with branches of the mammary and intercostal veins, the impediment to the circulation may be of several kinds. It may be either in the heart, the trunk or larger branches of the inferior cava, or in the Portal system. Pregnancy, tumours, or coagula causing obstruction in any of these vessels will throw the circulation into the epigastrics.

When the integuments are œdematous, the lineæ albicantes become more prominent than the neighbouring portions of skin, and have a knotty appearance, which has led to the mistaken appellation of *varicose lymphatics*. I have observed it chiefly in cases of tumour surrounded by ascitic fluid.

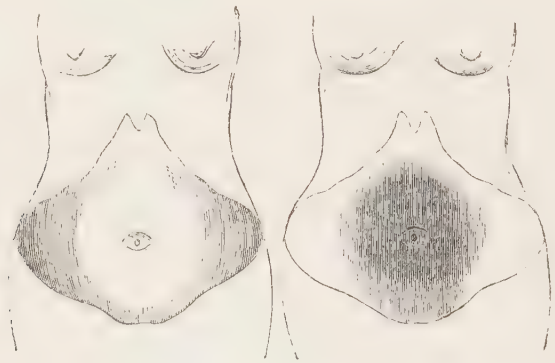
The *movement* on respiration is defective, both as regards the soft wall of the abdomen and the lower ribs ; while that of the upper ribs is exaggerated in both diseases. The alteration in movement only assists in diagnosis when it is partial or affects only one side. On making deep inspirations the upper part of an ovarian cyst may often be seen to rise and fall. This appearance is very characteristic. In ascites it may be simulated by some distended coils of intestine moving with the diaphragm; but the resonance of the intestine on percussion instantly settles all doubt on this point.

On *measurement*, the enlargement of the abdomen in ordinary ascites is equal on both sides, or symmetrical; and, although the distance from the sternum to the pubes is increased, the umbilicus retains its normal position—about an inch nearer to the pubes than to the sternum—and is about on a level with the highest point of the crest of the ilium on each side, and midway between these two points. In ovarian dropsy there is often a considerable alteration in the measurements between the umbilicus and sternum, and umbilicus and pubes, as well as between the umbilicus and the two cristæ ilii. In ascites the greatest circular measurement is at the level of the umbilicus; in ovarian dropsy it is often some inches lower down.

II. On *palpation*, the abdominal wall is felt to be harder and more resistant than natural in both diseases in the parts made tense by much fluid, but is soft and elastic elsewhere. Consequently the variation in the seat of hardness with the position of the patient becomes useful in diagnosis, the fluid in ascites gravitating freely to the most dependent part. *Fluctuation* is perceived with varying distinctness according to the degree of tension of the abdominal wall, to the thickness of the layer of fat, to the amount of œdema, to the thickness of the peritoneum or of the cyst, to the quantity and character of the fluid, and to the amount of tympanitic distension of the intestines. It occasionally happens that the abdomen is too forcibly distended to respond to the stroke, and gives no sign of fluctuation. In itself, it offers no assistance in diagnosis, because a thin-walled ovarian cyst, filled with limpid fluid, with a moderately tense and thin abdominal wall, would give a more quick and decided wave than a moderate quantity of ascitic fluid beneath an abdominal wall thickened by fat or subcutaneous œdema. The characteristic peculiarity of the fluctuation in ascites is that it varies with the position of the patient, and is only perceived in the parts where the fluid gravitates towards the abdominal wall; while in ovarian dropsy its situation does not vary with position, but is perceived wherever fluid is to be discovered by percussion.

III. *Percussion and auscultation.*—The two following diagrams represent the situation of clear and dull sounds obtained by percussion in typical cases of ascites and ovarian

disease, the patient lying flat and evenly on her back. The dark parts of the abdomen are dull, the rest clear. In ascites, the stomach and intestines are above and in front; the fluid, behind and on either side. In ovarian dropsy the fluid is in front, extending in different degrees to either side, and pushing the stomach and intestines upwards and backwards, just as a gravid uterus does. The figure to the right of the page, indeed, would represent either a gravid uterus near the full period of pregnancy, or an ovarian cyst of about the size of such a uterus, and situated centrally, as ovarian cysts often are at this, or a rather later, period of their growth. But quite as frequently they tend towards one side or the other, in such cases the diagnosis being, of course, easier.



It is seldom that a patient with ascites lies so flat as not to raise the shoulders enough to throw a layer of fluid downwards towards the pubes. Very often the dulness may extend as high as the umbilicus, and it generally does so when the shoulders are much raised by pillows. This might lead a superficial observer to suppose that the disease was ovarian, because there was a dull sound in the front of the abdomen; but on lowering the shoulders and placing a pillow or hassock under the hips, the fluid at once gravitates towards the diaphragm, the intestines float to the surface, and a clear sound is obtained where it was dull before. No such alteration in the situation of dulness can possibly occur in ovarian disease. So on turning from side to side, the fluid flows over to the side which is low, and the intestines rise to the upper side, with

corresponding changes in the situation of dull and clear sounds on percussion. This does not take place in ovarian disease. Again, at any spot near the level where the resonance of the intestines ends, and the dulness of the fluid begins, and a dull sound is elicited by *gentle* pressure and percussion, a *deeper* pressure will displace the fluid, and the resonance of the intestines will be again heard. At the most depending spots the amount of pressure necessary to obtain a clear sound is some guide to the estimation of the thickness of the layer of fluid. Superficial and deep percussion cannot produce such difference in the sounds in ovarian disease.

When fluid is free in the peritoneal cavity the wave of fluctuation may be felt not only where the sound is dull on percussion, but also beyond the line of dulness, even where resonance may be tympanitic. The intestines float in the fluid, and the fluid may be thrown in waves among them. But when fluid is contained within a cyst, fluctuation cannot be detected beyond the boundaries of the cyst. Hence the outline of the cyst, traceable by dulness on percussion, and the line where fluctuation can be perceived must be the same. The wave of fluctuation ends at the limit of resonance.

It has been supposed that percussion on the loins is a very sure guide in diagnosis—that when the patient is sitting up, and one loin is clear and the other dull, the disease is ovarian, but that when there is dulness on both sides it is ascites. One dull side is also supposed to be a proof that the ovary of that side is the one diseased. But there are so many exceptions to these rules, that they are of no great value, except as corroborating or counterbalancing other physical signs.

Auscultation alone affords little information, but it shows the presence of the gurgling sounds of the intestines in the spots clear on percussion, and the absence of these sounds in the dull spots, except on deep pressure by the stethoscope. In both diseases the fluctuation wave of fluid may be heard as well as felt. The aortic sounds and impulse are transmitted by the cystic and solid tumours, but not by ascites.

By applying these general rules a few seconds will enable the surgeon to clear up all doubt in any ordinary case. But there are various conditions which may lead to the necessity for further examination. The quantity of fluid in the perito-

neal cavity may be so large that the front of the abdomen is pushed far beyond the reach of the intestines. They float as far as the mesentery will allow them, but cannot reach the surface of the abdominal wall. In this case percussion must give a dull note in front just as it does in ovarian dropsy. So when the intestines are fixed in the back part of the abdomen by adhesions, or by a thickened omentum, the fluid is kept to the front as in ovarian dropsy.

Or an ovarian cyst may contain air or gas, either from a perforating communication with intestine, or through the Fallopian tube, or after tapping and decomposition of fluid. Percussion then gives a clear note in front or above, and a dull note behind or below, as it does in ascites; and occasionally, where there is a mixture of air with fluid, the sound so well known as metallic tinkling may be heard—air bubbling through fluid—or drops of fluid falling in the cavity. In these circumstances physical diagnosis alone cannot solve the doubt, and we have to consider all that can be learned from the history of the case and the general condition of the patient. So, when fluid is free in the peritoneal cavity we must resort to tapping and chemical or microscopical investigation before we can decide whether the fluid is the ordinary non-inflammatory serum which transudes into the cavity in heart, liver, or kidney disease, or the inflammatory exudation of chronic peritonitis in its simple or its tubercular or cancerous form, or whether it may be ovarian fluid which has escaped from a perforated or ruptured cyst.

IV. *Chemical and microscopical examination of the fluids.*—The normal Graafian follicle of the healthy ovary contains a minute quantity of a slightly viscid, whitish yellow, albuminous fluid resembling the serum of blood. It is alkaline, of pale whitish yellow colour, and transparent. It is not ropy but limpid, readily separating into minute drops. It contains a small quantity of a substance which will coagulate when treated with acids or alcohol, or when exposed to a raised temperature. It holds in suspension spheroidal, nucleated epithelial cells and shreds of epithelium from the membrana granulosa of the ovisac. These nuclei and cells, which are spheroidal in the human female, are prismatic in certain classes of animals. In the rodents ciliated epithelium will be found.

although only a small number of the cells possess vibrating cilia. In the human female, even in the normal condition, these cells occasionally become granular, and filled with fatty granules. When this is the case, they appear much darker than the surrounding non-granular cells.

After the rupture of the ovisac it would appear that the fluid contents, or 'ovarine,' escape into the peritoneal cavity; but the quantity is so minute that it can hardly do more than moisten the fringes of the Fallopian tube. There is not enough to penetrate far into the tube.

There are endless differences in the contents of ovarian cysts, and these differences seem to be in no way dependent on the form of the cysts or the anatomical arrangement of their tissues. Even the many strange epithelial developments are not accompanied by any special kind of fluid. In the simple unilocular cysts, it is most common to find a perfectly clear, hyaline, colourless, pale yellow, or straw-coloured fluid. But it is not always so, for all gradations of colour and thickness occur, and epithelial cells or scales are almost always floating in the fluids. In some rare cases there are cholesterine crystals which, after standing, form a glittering pellicle on the surface. But although the quantity is really very small, it is so very rarely met with in ascitic fluid, that it may almost be looked upon as diagnostic of the others. True albumen may be present, but in very uncertain proportions. It is in the few cases where it is absolutely wanting that simple tapping proves curative. Spontaneously coagulable fibrine is hardly ever a constituent of the simple cystic fluids, a character which distinguishes them from ascitic effusions, from which there is almost invariably a deposit of fibrine taking the form of elastic filaments after washing; the deposit from ovarian serum, if any, being soft and not at all elastic. Ascitic fluids never contain more solid matter than the serum of the blood, and the greater number of ovarian fluids have even less; but any serous fluid taken from the abdomen of a woman which, when filtered, leaves after evaporation a dry residue in excess of that which would be found in blood serum, may be pronounced upon as positively ovarian. Pus and blood are seen in different conditions; in some cysts they are mixed with the clearer fluid, and allowance must be made for them in chemical investigations. Among

the many cysts of a compound tumour, some may be seen with almost pure serum, and after tapping others may contain pus and offensive gases. Blood often mixes with the other contents, and influences the colour as well as other qualities. The yellow, green, brownish, or red tints depend upon the presence of bile acids or the admixture of blood and pus, which may be recent and pure, or old and undergoing changes. The turbidity of the fluid generally depends on the admixture of these secondary matters. Blood is not unfrequently effused into the smaller cysts, where it sometimes becomes fibrillated and partially organised, though it more frequently runs into a state of decomposition.

Since Scherer's discovery of paralbumen, and the subsequent discovery that this derivative or altered form of albumen proper is a chief ingredient in ovarian fluids, it was at first believed that it would be a sure means of distinguishing these from all other fluids in abdominal swellings. But later experience has proved that this test alone is unreliable. The presence of paralbumen is certainly not a positive sign that fluid has come from an ovarian cyst. Dr. Schetelig found the contents of a very large renal cyst, which he had emptied, to consist mainly of paralbumen with cholesterine, and there was no trace of urea, the proper kidney structure having been completely annihilated. But Scherer also pointed out the relations of metalbumen to mucin, which, he says, colloid matter always contains in considerable quantity; and he also raised the question whether metalbumen ought not to be considered as a transition state between albumen and mucin or colloid matter. Paralbumen and metalbumen are forms of albumen which differ from the true albumen in that they are soluble in boiling acetic acid. You take a test tube and boil the ovarian fluid; the albumen is coagulated. You add double the volume of strong acetic acid to the coagulum, boil, and shake it; when, if the albumen be true, the coagulum does not redissolve in the acetic acid. But supposing it to be paralbumen or metalbumen, then it either dissolves or forms a whitish transparent fluid, or breaks up into a kind of jelly-like translucent mass which is quite easily distinguishable from redissolved albumen coagulated by heat. These results led to the belief that we had a means of diagnosing abdominal fluids, and it was said that if the coagulated albumen

from them dissolved in acetic acid they were ovarian; and if it did not redissolve, it was said to be ascitic; and that was frequently right. Sometimes, however, part would redissolve and part would not; and then the supposition was that it was a mixed fluid, some ovarian and some peritoneal; that an ovarian cyst had burst and some of the fluid was in the peritoneal cavity, making a combined fluid which contained some true albumen and some paralbumen; and this inference was really often true, though open to occasional exception.

There are sometimes traces of sugar; and fibrinogen, when a constituent, may be demonstrated by applying A. Schmidt's test, which is the addition of a few drops of blood to the fluid, when a distinct clot will form in from twenty-five to ninety minutes, involving the blood corpuscles which had been added. The clot is generally so firm that it can be raised unbroken, and if squeezed in the hand a quantity of fluid issues out, leaving a loose bundle of fibrillated substance. Klob divided the contents of an ovarian cyst into two portions. Into the one he poured a few drops of blood, and at the end of three hours the whole was converted into a mass as solid as jelly, while the other portion without blood showed no signs of coagulation, even after long standing. Fibrinogen, however, is also found, according to Schmidt and Virchow, in other serous secretions and in ascitic fluid. The presence of fibrine was always regarded as a proof of an abdominal fluid having been effused from a serous membrane, not from the secreting membrane of an ovarian cyst. And if fluid contained both fibrine and paralbumen, the supposition was that an ovarian cyst had burst and there was a mixture of two fluids. If no fibrine could be detected in ovarian fluid taken from the peritoneal cavity, then it was supposed that, instead of preserving their own chemical characters after admixture, the fibrinogenous elements of the serous fluid were acted upon by the paralbumen in such a way as to interfere with the characteristic coagulation.

Dr. Schetelig, of Hamburg, who has diligently studied this subject, informs me that, in a case he watched at Breslau, the presence of fibrine in the fluid at the first tapping showed that it was purely ascitic —while, on the tapping being repeated, coagulation did not take place, and paralbumen was detected. This was accounted for by rupture of an ovarian cyst into the

peritoneal cavity, a supposition which was subsequently proved to be correct at the time of ovariotomy.

Nor does the presence of fibrine prove that the fluid is not ovarian, for in a dermoid tumour containing bones and hair, which I removed in June 1869, Dr. Schetelig made out three distinct kinds of fluids in a number of isolated cysts. In some there was an emulsion of fat and cholesterine; in others the albuminoid liquid so common in ovarian dropsy; and thirdly, in different parts of the large tumour, 'certain small isolated bags full of a limpid thin serum, which, being exposed to the atmosphere, soon coagulated like any other serous fluid overcharged with fibrine.'

The more consistent colloid substances are occasionally distributed in ovarian cysts in a very peculiar manner. They form conical columns with their broad bases directed outwards. Between these almost isolated columns, a whitish or yellowish white matter, consisting of epithelial cells in a state of degeneration, is placed without any definite arrangement. Such cysts have probably been formed by the confluence of several smaller cysts of which nothing remains but the epithelial investment undergoing fatty decay, and so tracing out the former lines of separation.

The chemical examination of colloid substances and other fluids from multilocular cysts has given results of the most contradictory kind, as is seen by Dr. Méhu's assertion, that he has never found a trace of mucin in ropy ovarian fluids; but this may be explained by the supposition that operators have not all had the same opportunity of collecting a great variety of specimens, and have not dealt with the matter in the same stages of transformation.

While it is certain, therefore, that in cases of doubtful diagnosis complete reliance cannot be placed on the chemical characters of fluids removed from the abdomen, and that the rule of paralbumen being the characteristic of ovarian fluids, and fibrine of serous fluids, and the conjoint presence of paralbumen and fibrine pointing to a mixture of the two fluids, is open to many exceptions, it is still true that the rule is sufficiently often correct to become an aid of much value in arriving at a diagnosis, and to encourage us to attain more accurate knowledge by more extensive observation and more complete research.

The most recent publication on this subject is the 'Étude sur les Liquides extraits des kystes ovariques,' by Dr. C. Méhu, Pharmacien de l'Hôpital de la Charité, which appeared this year in the 'Archives Générales de Médecine' for the month of September. In it he states that all his investigations, microscopic and chemical, were made upon fluids drawn from the living patient—never from cysts after ovariotomy or from the dead body:—

That, while he found the proportion of organic matter to vary from 2·50 grammes to more than 140 grammes in the kilogramme of filtered, and 200 grammes or more in the unfiltered ovarian fluids, the weight of mineral salts obtained from the same quantity was nearly uniform, from 7 to 9 grammes, generally between 8 grammes and 8·50 grammes:—

That he could almost always trace the appearance of liquid oil to its use on the trocar:—

That the fatty matters found on the surface of the turbid fluids, after being heated for a certain time and then cooling at rest, are the products of the disintegration of the granular aggregations and cells containing translucent granules often floating in the recent fluids:—

That the aggregations of granular matter are simply adherent without envelopes:—

That he considers the large transparent cells with granular contents to be leucocytes considerably enlarged, and not in any way characteristic of ovarian fluids; as he had seen them as often in the fluids of ascites, hydrocele, old serous cysts and hæmatoceles, especially when the collection was of long date:—

That he discovered cholesterine only nine times in 115 ovarian fluids taken from 61 patients, never in larger quantity than 30 centigrammes in the kilogramme; that even the small amount of 10 centigrammes, which was the most frequent, gave the glittering appearance in sunlight; and that it was very rarely seen in ascitic fluid—only twice in 300 cases, one of which had an ovarian tumour, and the other partial peritonitis with Bright's disease:—

That the absence of spontaneously coagulable fibrine is the only characteristic which he has found distinguishing ovarian fluids from those of ascites, since in pure ascitic fluids after twenty-four hours' rest there is almost always a deposit of some

centigrammes per kilogramme of fibrine taking the form of elastic filaments after washing, especially when the effusion has been caused by the irritation of a tumour; while ovarian fluids never give a deposit of this kind spontaneously, and acetic acid only causes the separation of a small quantity of soft matter not in any way elastic:—

But that, in connection with this observation, it must be remembered that when containing a large quantity of leucocytes ascitic fluid does not yield a deposit of fibrine, and that it is necessary to make allowance for the admixture of blood in the ovarian fluids:—

That, as ascitic fluids never contain more solid matter than the serum of the blood, any filtered serous fluid from the abdominal cavity of which the dry residue weighs more than 70 grammes per kilogramme may be pronounced ovarian, and that with a proportion of 80 grammes or more there can be no longer any doubt:—

That this point of diagnosis only applies to the minority of cases, as the greater number of ovarian fluids leave a deposit of less than 70 grammes:—

That the only cases of cure after tapping are those in which the fluid comes from a simple cyst, is clear, free from albumen, and yields a residue of not more than 18 grammes to the kilogramme:—

That the composition of the fluids varies very much in twin tumours, in the different parts of a multilocular tumour, and at the earlier or later stages of the same tapping:—

That the viscidity of the ropy ovarian fluids is due to paralbumen, which has never yet been produced separately in a pure state; and that he has never found a trace of mucin in them.

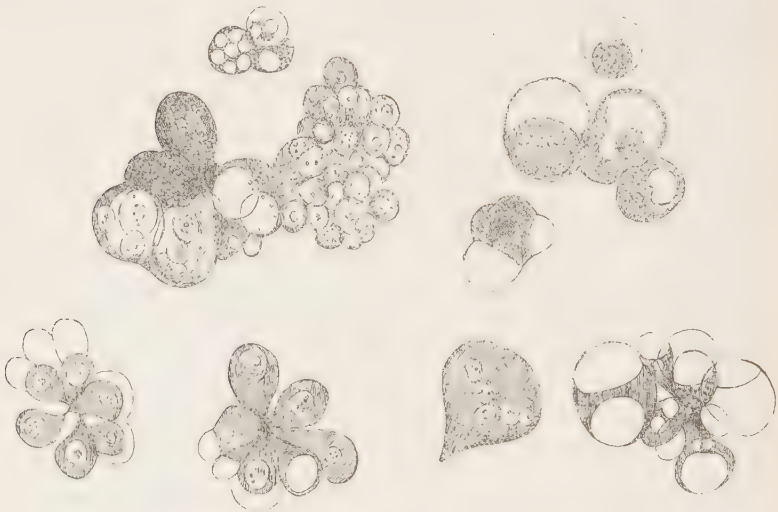
It is to be regretted that the service afforded to our diagnosis of abdominal fluids by assisted sight is not much better than uncertain. Microscopical science in its application to medicine requires the skill, aptitude, and discrimination of an expert. Observations made without wide experience, the most scrupulous precautions, and an absolute freedom from speculative bias are absolutely misleading. In ordinary practice the necessary qualifications and conditions are rarely at command. Such work as has been done hitherto leaves us in this position,

that we can hope for no positive guidance in forming our judgment, and must be satisfied if we can sometimes get a slight confirmation of opinions by the ocular interpretations of objects under magnifying power.

Long ago Dr. Hughes Bennett, of Edinburgh, took this matter of the investigation of ovarian fluids in hand, and he was followed by Mr. Nunn. Both observed the same granular cells and granular matter in many of their examinations, and Dr. Drysdale has done so too. Dr. Bennett and Dr. Drysdale are disposed to regard them as diagnostic, but Mr. Nunn accepts them as of only secondary importance as a point of evidence. Dr. Peaslee remarks upon their frequent absence from fluids taken from cysts removed from the ovary, and thinks the utmost that can be said is that they give a presumption of ovarian fluid when seen. The later work of Foulis and Thornton does not add any greater certainty to this question; but they have gone a step further, and pointed out that in cases of ovarian or peritoneal cancer or sarcoma there are to be found in the abstracted fluid evidences in the shape of what they call 'characteristic groups of cells.' These they describe as large pear-shaped round or oval cells containing a granular material, with one or several large clear nuclei with nucleoli and a number of transparent globules or vacuoles. The cells composing the groups are many of them very large, but the great variety in size and shape is the marked feature of the group.

The discovery of these objects ought no doubt to put us on our guard when we have to deal with tumours doubtfully malignant. If seen, one may be pretty certain that the tumour is in some way malignant; or, if they be found in fluid removed from the peritoneal cavity, probably a sort of infecting process has been going on there, from the rupture of an ovarian cyst of a malignant character. These cells may have planted themselves and multiplied, or they may have given a taint to the cells of the part and influenced them to a malignant form of reproduction. The truth, however, really is that malignant disease is a condition of degradation. Nutrition is imperfect and development is misdirected. It has no specific form of cell, but such cells as are produced in its growth are deformed, distorted, and early necrosed; and the microscopic objects we find in general in the suspicious ovarian fluids are

nothing more than groups of cells, some proliferating with rachitic profusion and monstrous, others either dying or dead;



all being evidence of abnormally rapid growth, retrograde change, and the early death of successive generations of degenerate cells, the essential characteristics of malignant disease.

DIAGNOSIS OF ENCYSTED DROPSY, AND CHANGES PRODUCED BY CHRONIC INFLAMMATION AND CANCER OF THE PERITONEUM.

The fluid poured out as the result of inflammation of the peritoneum, instead of lying free in the cavity, is sometimes confined in pouches formed by adhesions among the viscera, or by false membrane deposited during the disease, or by attachments of the omentum or mesentery.

In his classical work 'On Diseases of Women,' Dr. West says: 'One instance of this latter occurrence has come under my own observation, in which between four and five quarts of a dark fluid were found collected between the folds of the omentum, and during the patient's lifetime frequent discharges of a similar fluid had taken place from the umbilicus. The dropsy had during the life of the patient been supposed to be ovarian; but though malignant disease of both ovaries was discovered, yet neither of them contained fluid at all similar

in character to that which was found in the omentum; nor, indeed, could either be detected till after the fluid in the omental cyst had been let out. I am aware of no means by which such cases are to be discriminated from ovarian dropsy; as far as I know, their nature has scarcely ever been suspected during the lifetime of the patient.'

The fluctuation, even if distinct, is always limited in extent, and confined to the same spots. The intestines are found behind or beside the tumour, and do not as in ascites rise up to the front of the abdomen, or vary with the position of the patient. The appearance of the belly is flatter than in cases of tense ovarian cysts, the distension is slower, the respiration is less impeded, and œdema of the extremities is seldom seen.

Sometimes, too, the small intestine and omentum may be matted together, and the way in which one may be misled under such circumstances is seen by the following notes from my case-book.

February, 1870.—A lady, aged 44, married for fourteen years, was sent to me by Dr. Lowe, of Lynn. She was cachectic, pale, and considerably emaciated, with very distinct fluctuation of the abdomen in all directions; the os uteri open, and the cervix large. By the vagina, what was supposed to be a cyst could be felt behind and above the uterus. The menstruation was usually regular, but she had lately been somewhat over the time, and had had some flooding. Four years ago had an early abortion, lost much blood, and was left very weak. Within the last two years there had been some increase of size, but not rapid until the last nine months, accompanied by occasional acute attacks of pain on the right side, the last a year ago. Diagnosis; ovarian cyst, chiefly one large cyst. Tapping was advised and done immediately. Seventeen pints of fluid were removed, a good deal also being left behind. On March 17 she was filling again, having had a catamenial discharge in February after the operation. The urine was free after the tapping, but was now again becoming scanty and thick. Fluid could be felt in the peritoneal cavity; the uterus was free, but the cyst could not now be found behind it. The operation for removal of the tumour was done on March 31. An incision of four inches was made between the umbilicus and

symphysis pubis. The peritoneum was opened by a puncture, and much clear fluid evacuated. On enlarging the opening in the peritoneum enough to admit two fingers and see within, the whole of the fluid was found to be in the cavity. The uterus was roughened on its peritoneal surface, and both ovaries felt large, that on the left side as big as a walnut. Above and to the left was a mass feeling very like a multilocular ovarian cyst, evidently formed by adhering coils of intestine, thickened peritoneum, and omentum. There was scarcely any bleeding, and the wound was closed with sutures. She had no bad symptoms after the operation; the wound healed well, and she went home on April 16. In this case the uterine examination and the moving mass above the umbilicus deceived me; the mass of intestine and omentum felt so very much like an ovarian cyst. In subsequent cases percussion has removed doubt.

Two very similar cases are recorded in the American journals; one in which Dr. McDowell, after considering the diagnosis as certain, opened the abdomen and found nothing but a mass of intestines conglomerated by adhesions; the other in whose abdomen the ovaries were discovered by Dr. Henry Smith to be sound, and the swelling due to thickened and indurated omentum.

But these localized collections of fluid in the peritoneum may be associated with cancer and tubercle of the membrane, and give rise to difficulties in the diagnosis, as in the case of an unmarried lady, aged twenty-two, whom I saw in consultation with Mr. Seymour Haden in 1862. The abdomen was as large as that of a woman near the full period of pregnancy, and was distended uniformly by fluid, which gravitated so decidedly to the lowest point with all changes of position, that it was evidently free in the peritoneal cavity; and looking to the appearance of the patient, and to the fact that she had occasional pain, I had little doubt as to the disease being a sub-acute form of tubercular peritonitis.

Mr. Haden, who six weeks before had tapped the patient, concurred in that opinion, and a tonic treatment with diuretics was commenced. For a time she improved, but during the autumn all the symptoms were aggravated, and I met Mr. Haden again on November 3. A remarkable change was then

found to have taken place. The abdomen was much more prominent or arched than before; it was dull anteriorly in all positions of the body, and clear in both flanks as she lay on her back. Moreover, on taking a deep inspiration, a cyst appeared to move downwards from the epigastrium beneath the parietes. Fluctuation was evident in all directions. This led me to doubt the accuracy of my first opinion, and it was arranged that she should be again tapped, partly to afford relief, and partly to clear up the diagnosis. She was tapped by Mr. Haden on November 12, and eighteen pints of clear amber-coloured fluid were removed, which deposited a cloud of flocculent mucoid substance, very much resembling that so often seen in ovarian cysts.

On November 19 Mr. Haden and I examined her again most carefully, with the express purpose of ascertaining whether we were dealing with tubercular peritonitis or with a thin non-adherent unilocular ovarian cyst. We both felt it impossible to arrive at a positive decision; but while Mr. Haden leaned to the belief in peritonitis, my own impression was rather the other way. In this state of uncertainty, and feeling that repeated tapping must be useless, it was arranged that a small incision should be made; and if a cyst was found it should be removed, whereas if there were no cyst the incision would serve instead of tapping. Accordingly on December 24, 1862, Mr. Clover administered chloroform, and, assisted by Mr. Haden and Dr. Savage, I cautiously made a small incision below the umbilicus, and opened the peritoneum. No cyst appeared. A large quantity of opalescent fluid escaped, and then the whole of the peritoneum was seen to be studded with myriads of tubercles. Some coils of small intestine were floating, but the great mass was bound down with the colon and omentum, all nodulated by tubercle, towards the back and upper part of the abdomen. The uterus and ovaries were felt to be of the normal size, but their peritoneal coat was very rough. All the fluid was carefully pumped out by an india-rubber syringe, the wound was closed by sutures, and the patient treated precisely as after ovariotomy. She went through rather a sharp attack of peritonitis, but after two or three days suffered hardly more than after tapping. She passed large quantities of urine, and it seemed as if the use of the catheter excited this diuresis—

so much so that Mr. Haden had it continued long after the wound was healed.

But the most remarkable part of the case remains to be told. The patient got well, married, and has been well ever since she recovered from the operation. Whether the peritonitis set up led to fresh adhesions or not, certain it is that no more fluid was secreted, and the patient regained health and strength. The case would serve as a striking appendix to Martin's curious paper 'On the Operative Treatment of Peritonitis.'

In a note which I received from Mr. Haden, dated November 1, 1864, he says, 'By a mere chance I happened to see her yesterday. I met her in the street. She was perfectly well.' Mr. Haden wrote to me again in April 1872, saying that this lady 'married in 1866. She has no children, but is stout, hearty, and well.' I hear that she is well in 1881.

The tumour from cancer of the peritoneum may become so large as to occupy a very great extent of the abdomen, but it is much more solid to the touch than the enlargement due to general tubercular disease of the same part. It is also sometimes accompanied, as in a case mentioned by Dr. Ballard, by an effusion of gelatinous matter into the sac, indicated during life by general and extreme filling up of the abdomen, with great elevation of the diaphragm as in ascites, dulness on percussion everywhere but at the epigastrium and along the margin of the ribs on the right side, and the most perfect fluctuation in every part. In fact, the symptoms produced by this condition of the peritoneum have been sometimes so closely like those met with in many cases of ovarian cysts as to deceive men of very great experience; and I have repeatedly been sent for under such circumstances expressly to discuss the question of ovariotomy, when the patient was not very far distant from the end of her career. Even among my own cases the coexistence of cancer has been so masked by the symptoms of ovarian disease that one has been led on by the hope of giving operative relief.

The housekeeper of a patient of Mr. Jones of Epsom, aged 54, very corpulent, in October 1868 had a tumour in the left side about the size of a cricket ball, which had been previously recognized as ovarian by Drs. Priestley and Farre.

Three years before, there had been some ulceration of the neck of the uterus, and a vascular growth at the orifice of the urethra. By the month of December 1868 I found the whole abdomen filled by an elastic soft tumour, indistinctly fluctuating; the pulse rapid and feeble, bronchial murmur in the upper part of both lungs, pain down the left thigh, and within the last ten days falling off in the general health. I advised tonics and tapping, as her state was not then favourable for the operation of ovariotomy. She was accordingly tapped early in January 1869, by Mr. Jones, below the umbilicus, with the removal of eleven pints of bloody serum. On February 2, I found her in a much better state of health, but the tumour felt rather elastic than fluctuant; and though the cervix uteri was mobile, and there was no vascular murmur, doubts as to the uterine nature of the tumour arose in my mind, and I decided to begin the operation by an exploratory incision.

On Feb. 18, this was accordingly done. The peritoneum exposed was so thick that I doubted whether it was the cyst or not, and so tapped rather than make any separation of it. Some pints of red serous fluid escaped, and more still when the trocar was withdrawn. On enlarging the opening some small intestines appeared floating in the remaining fluid. It was then seen that a multilocular cyst had given way behind, and that its sac formed one general cavity with the peritoneum. Below a large secondary cyst was prominent. This I tapped and emptied, and then found the whole of the outer coat of the large cyst so intimately adherent not only to the abdominal wall, but also to the uterus and sides of the pelvis, that I determined not to attempt any separation, especially as some hardish white nodules which were irregularly scattered about the cyst walls were very suspicious in appearance, and strongly suggestive of carcinoma.

Very little blood was lost, and the wound was closed with sutures. The operation confirmed the previous suspicion which had arisen as to the rupture of a cyst before the tapping, and the diagnosis of malignant disease which the cachectic looks and general symptoms had suggested. She died about sixty hours after the operation.

Report of examination thirty-eight hours after death by Dr. Grenser, of Dresden.—'Dressing had never been removed.

and was nearly dry. The wound had united entirely outside and inside, and nearly without any discharge. The peritoneum, thickened, had entirely lost the character of a serous membrane —represented a thick, tough, ash-coloured membrane extending all over the abdominal cavity and its contents. It contained about two pints of reddish fluid without clots. The intestines were much distended, slightly adherent to the abdominal wound, but free in all other parts.

Cancer (fungus medullaris) of the mesocolon transversum, 10–12 inches in length and one inch in breadth, extending to the edge of the spleen, which is not involved. The cancer is very soft, and contains a great quantity of detritus.

Multilocular cyst of the right ovary, the size of a fœtal skull. One cyst showed the trace of tapping during the operation. The cysts do not contain much fluid, but mostly cancerous matter, not quite so soft as the cancer of the mesocolon.

Strong adhesive bands round the uterus and the ovaries, which entirely surround and hide the uterus and the left ovary, which could not be seen before separating the bands. Uterus small, healthy, except one small point, the size of a pea, on the fundus which looks white and cancerous. Cyst of the left ovary the size of a walnut; no cancer.'

Another similiar case was that of a widow, aged 51, who on her admission to the Samaritan Hospital in July 1868 was in a pallid, anæmic state, much emaciated, with her feet cold and œdematous, and the breasts wasted. She had a hard, movable nodule under the right false ribs, and a tumour in the abdomen visibly movable, without any evidence of adhesions. The parietes of the abdomen were thin, marked with numerous lineæ albicantes, but there were no dilated veins. A wave of fluctuation was felt over the surface of the tumour, and the sounds on percussion were clear two inches above the umbilicus, dull in the lumbar region. The cervix of the uterus was far back, the os open, and the cavity two and a half inches in length. The tumour could be felt in front of the uterus, and through the rectum. The appetite was bad, with pain after meals and relaxed state of bowels. She slept badly, lying best on the left side and back, had great depression of spirits, and, though the sounds of the heart were normal, the pulse was 96, very weak

and thready. She came of a healthy family, had lived in the country comfortably, and notwithstanding her delicacy had never been seriously ill.

The tumour began to form about twelve years before, but caused no inconvenience for six years. It then grew rapidly, filling the abdomen, without much pain, but giving rise to sickness, loss of appetite, irregularity of the bowels, and cramps in the left leg. The size had so much augmented of late that she had great dyspnœa and was unable to walk. I had seen her in 1866, and then diagnosed 'Uterine tumour, probably malignant.' At the date of admission, in 1868, I wrote, 'Abdominal tumour, surrounded by ascitic fluid—if uterine, an out-growth, as the tumour can be moved without moving the cervix.' She was twice tapped, about twelve pints of clear and slightly coagulable fluid being drawn off from the peritoneum each time.

On August 3, a tentative incision was made. A white glistening tumour was exposed on dividing the peritoneum. A few pints of clear fluid escaped, and I then felt the movable nodule under the right false ribs to be apparently a lump of cancer in the abdominal wall. The uterus and ovaries seemed to be fused together, the intestines adhering behind; there were also some slight but vascular parietal adhesions. I did nothing more, and closed the wound. There was scarcely any hæmorrhage. She died about ten days after the operation. The skin surface of the incision had not healed; there was some pus in the subcutaneous cellular tissue, but the peritoneal edges of the wound were firmly united. There were about three or four pints of serum in the peritoneal cavity, and adhesions of the omentum and transverse colon to the upper part of the tumour. A hard, white nodule as large as a walnut, in the abdominal wall below the right false rib, was found by Dr. Junker to consist of fibrillated connective tissue, with large oblong, nucleated cells in an advanced stage of fatty degeneration. Both ovaries were fused together, and formed one tumour; unless a sebaceous and piliferous cyst on the left side was formed exclusively by the left ovary, and the rest of the tumour by the right. The uterus was small and normal, but closely connected, without anything like a pedicle on either side, with the ovarian growths. The liver was small, not hard, and its peritoneal coat adhered to the abdominal wall and

diaphragm. The tumour was sent to Dr. Wilson Fox, who reported that 'he could find nothing but the ordinary cystic development. In fact, there were very few solid portions, less indeed than in many. There was much hyperæmia in many parts, and in others large tracts of fatty degeneration. The dermoid formation was limited to a very small portion of the tumour, and to one or two cysts. This seems often to be the case. It is rather singular that it should be so. In this part there was much sebaceous material.'

In all such cases suspicion of their real nature should be aroused if a patient has either a very thin and tense, or an œdematous abdominal wall, anasarca of the lower limbs, general emaciation, a cachectic aspect, free fluid in the peritoneal cavity, and especially so, if the loss of flesh and amount of pain are more rapid and severe than an ovarian or other innocent tumour would account for.

TYMPANITES AND PHANTOM TUMOURS.

One may easily understand how tympanitic distension of the abdomen, which is not unfrequently seen in hysterical women, may give rise to some awkward questions; but, except from personal observation, or the testimony of men so accurate as Bright, Simpson, or Boinet, it is difficult to believe that any surgeon of reasonable experience, or in his right senses, could be so deluded by such a condition as to think that he had before him a case of solid ovarian tumour, and attempt the operation of ovariotomy. Yet Simpson says that it has happened no less than six times, and Bright published the following case in his work on Abdominal Tumours: 'Susannah J., æt. 30, said to have been ill for two years, was admitted, under my care, into Charity Ward, September 29, 1824, complaining of abdominal pain and some hysteric symptoms. She had, in the middle line of the abdomen, about half-way between the umbilicus and symphysis pubis, an unhealed scar, of about three inches in length. The deeper part of the wound had united, and it was filling up by granulation, as was a portion of the external part, at each end of the scar. It was evidently an incised wound, and the account she gave was that her abdomen being

swollen, as it was at the time she had formerly been in the hospital, a surgeon proposed to her the excision of a tumour which produced this swelling, and that, with two assistants, he prepared to perform the operation, and made a free incision into the abdominal cavity; but finding that there was no tumour, brought the wound together, which now, after the lapse of several weeks, was as we saw it. The wound healed completely under common treatment, but her health remained in a most unsatisfactory state, both from the frequent tendency to diarrhœa and from the succession of pains, with occasional

puffing up of the abdomen, of which she was the subject, so that she remained in the hospital till December 28.

'During this long confinement the tumour of the abdomen varied a good deal, and was, on one or two occasions, reported to have subsided entirely.

'I may mention further that I had seen this young woman many years before, when she was in Guy's Hospital for a supposed abdominal tumour, under Dr. Marcet, who, however, soon discovered its hysteric character, though, certainly, the abdomen bore a very peculiar appearance, strongly resembling an encysted tumour; but there were connected with this supposed tumour so many other ailments, embracing fits of hysterics,

epilepsy, paralysis, abdominal and lumbar pains, so varied and so changing, that a little observation was sufficient to convince any experienced person of its real character.'

Boinet relates also that a miserable woman of weak intellect, tympanitic and impressed with the notion that she had an abdominal tumour, was unfortunate enough to meet with two or three surgeons who, from some unaccountable motives, persuaded themselves that she had ovarian disease, and gave way to her importunate demands for an operation. Their rash gastrotomy only showed the existence of cancer, and killed the woman.

These hysterical distensions of the abdomen present themselves in a variety of forms. Sometimes the belly is uniformly blown up to the size of advanced pregnancy, and is rounded, hard, and resistant. The hand makes no impression on it, and change of position causes no alteration in shape. But, of course, there is no fluctuation—the resonance is universal, hysterical symptoms are generally present, and, under the influence of chloroform, the swelling entirely disappears, leaving the abdomen flaccid, and allowing the hand to rest upon the hard bones of the spine. In other cases the distensions are local, and it is noticed that they occur more often

on the right side. Portions of the abdominal wall are gathered up into rigid knots, which remain so long unaltered as fully to simulate an internal tumour, especially as they are sometimes situated over accumulations of hardened fæces, and are accompanied by a good deal of tenderness of the parts. Careful and patient palpation, purgatives, and chloroform will generally lead to a solution of the mystery, or may even disclose the existence of an unsuspected incipient ovarian tumour, which, by its presence in the pelvis, had given rise to the train of hysterical symptoms, and, among others, to the superimposed

swelling, apparently the most important matter calling for treatment.

The drawing on page 107, from a photograph by the late Dr. Wright, shows how very accurately one of these phantom tumours, or the condition which I have now been describing as hysteric tympanites, may resemble a uterine or ovarian tumour. The lower part of the abdomen arches forward exactly as in pregnancy, or as in an ovarian tumour of moderate size when the abdominal wall is not lax; and the wall is so tense, the patient so resists pressure, or complains so much of tenderness on pressure, and the abdominal muscles contract so spasmodically and irregularly, that it is by no means difficult to fancy that a tumour, or even the movements of a fœtus, may be felt. The girl, whose portrait is here given, was in the Samaritan Hos-

tal for some time, and it was difficult to convince her, her friends, and even some medical friends who saw her with me, that she had no abdominal tumour. The tympanitic resonance on percussion was, of course, the leading element in the diagnosis; but the most conclusive test was the complete subsidence of the swelling, and the flattening of the abdomen when the girl was fully under the influence of chloroform. The photograph from which the second drawing was taken was made while she was completely narcotised. The arched abdomen is seen to have been quite flattened, and it was easy, when the abdominal walls were so flaccid, to feel the pulsations of the aorta, the vertebral column, the brim of the pelvis, and to become perfectly certain that there was no abdominal nor pelvic cyst of any kind. Yet the instant the effect of the chloroform began to pass away the tumour always began to reappear. This was shown several times when the experiment was tried, and on one occasion Dr. Wright took a photograph (p. 109) when she was nearly awake, and the tumour was almost as prominent as in her ordinary condition, shown in the first drawing. She was an hysterical girl, but there was no voluntary or conscious imposition on her part so far as I could ascertain. She improved under a course of purgatives and steel, but I have not seen her since she left the hospital. In one woman the abdominal wall thus expanded gave rise to a suspicion of double ovarian cyst. The recti muscles formed a distinct line of demarcation between two protuberances. The supposed tumour seemed to be well defined, but the belly resumed its natural shape under chloroform.

Early in 1872, a woman was sent to the Samaritan Hospital, supposed to be suffering from a large ovarian tumour. The tympanitic resonance, with the absence of fluctuation, at once showed that there could be no large abdominal tumour, but some hardness above the pubes led to a vaginal examination, when an early pregnancy was detected. On administering chloroform the distended abdomen at once flattened down, and the outline of the enlarged uterus could be distinctly traced. This is the only case in which I have seen tympanites occur in a pregnant woman. I have, however, several times seen it accompany small fibroid tumours of the uterus, uterine polypi, uterine displacements, and small ovarian tumours which have not risen

out of the pelvis. Once only have I met with this voluminous turgidity in a man, and with him I had no difficulty. He was one of the Crimean invalids, and came into my hands at Smyrna.

FIBRO-PLASTIC AND FATTY TUMOURS OF PERITONEUM, OMENTUM, AND SUB-PERITONEAL CELLULAR TISSUE.

The symptoms caused by the growth of large fatty and fibro-plastic tumours from various parts of the peritoneum or mesentery so much resemble those of true ovarian disease, that their real nature can only be determined in some cases by an exploratory incision or tapping. The difficulties and dangers attending these obscure diseases are exemplified in the histories of the cases which now follow.

A lobulated mass of fat weighing twenty pounds was removed from an unmarried lady, forty-three years of age. She had been suffering several years from an abdominal tumour, and for more than a year had been confined to her room. Various opinions had been entertained as to the nature of the tumour, and on October 24, 1867, I made an exploratory incision, and found that the tumour was a mass of fat. The opening was closed to gain time for consultation as to future treatment. The wound united well. The patient suffered very little, and it was arranged that an attempt should be made to remove the tumour. This was done on November 5, 1867, and large masses of fat were extracted after dividing a loose cellular capsule. A large lobule felt in the neighbourhood of the right kidney was not disturbed. Not more than three or four ounces of blood was lost. Four vessels were tied in the tissue of the capsule. The tumour appeared to have originated in the mesentery. Some of the lobules were evidently *appendices epiploicæ* enormously hypertrophied.

The patient died fifty-eight hours after the operation. On post-mortem examination, traces of recent peritonitis were observed, but none of bleeding. The mass of fat left on the right side involved the right kidney, pushed the ascending colon over to the left, and adhered to the under surface of the liver. Many mesenteric glands were enlarged and enveloped in fat. There was not more fat than usual in the omentum.

The weight of the portion of fatty tumour not removed during life was estimated at ten or twelve pounds, but it was not weighed. The uterus and both ovaries were healthy.

Mr. J. Cooper Forster, in the 'Pathological Transactions,' vol. 19, records another case of fibro-fatty tumour of the abdomen, weighing fifty-five pounds. Dr. Moxon said the microscopic examination showed in all parts a large proportion of ordinary fat-cells. In the greater part of the tumour—the part that had the appearance of common healthy fat—these, with the usual connective filaments and vessels, made up the tissue, which was histologically perfect fat.

The wife of a railway guard, aged twenty-six, living at Bromley, Kent, was admitted into the Samaritan Hospital from St. Bartholomew's in December 1869. She had a child two years before. After her confinement she felt a small lump in the right iliac region. This increased very slowly until the May of 1869, and caused very frequent nausea. After May the growth was rapid; and the diagnosis was—Ovarian tumour, closely connected with the uterus. On February 23, 1870, an exploratory incision was made. On exposing the peritoneum some large veins were seen on the surface of a dark blue tumour which was very elastic. Avoiding the veins, a trocar was introduced, and three or four pints of bloody serum escaped. Then I perceived that the tumour was an extremely vascular, soft, friable, granular mass, and satisfied myself by stopping the bleeding, which was rather free both from arteries and veins. Two or three were tied; solid perchloride of iron was passed into the cavity, and two pins were introduced, around which silk was twisted, to close the opening. The pins were fastened outside the abdominal cavity, and the wound closed with sutures. She died March 3, and, on examining the body eighteen hours after death, I found the tumour to be firmly adherent to the abdominal wall, to the liver and intestines, and to the uterus behind; but both uterus and ovaries were free from disease. In some parts there were detached bodies like large appendices epiploicæ, and from some of the intestines there were cyst-like growths, which I sent with the tumour, liver, spleen, and kidneys to Dr. Wilson Fox, whose report follows:—

'I have examined the masses which you were kind enough

to send to me, microscopically. They appear to be of a malignant nature, but rather, perhaps, occupying a doubtful place between true cancer and fibro-plastic growth. As far as I can make out their origin, it appears to be either omental or peritoneal. The growths on the intestine appear to originate very distinctly in the serous covering. They consist almost entirely of spindle-shaped, and caudate, and large round nucleated cells, together with an abundant supply of blood-vessels, which are very large and greatly distended. In many places these have ruptured both on a large and on a small scale. Whether such extravasations have been the origin of the cysts is in all cases difficult to determine. In some places this mode of origin is pretty distinct; in others, the cysts appear to originate from an acute fatty disintegration and softening of parts of the tumours; but in others the cysts appear to have originated as spaces filled with a sort of albuminoid, semi-fluid material analogous to those found in enchondromata. I could find no secondary implication of the other organs—a fact which appears to militate against the malignant nature of the original mass. The liver, spleen, and kidneys, all softened and "cloudy," present merely the affection common to these organs in septic and acute inflammatory disease.'

In Virchow's 'Archives of Pathological Anatomy' (Bd. 63, No. 4) he describes a retroperitoneal tumour, which I removed from a lady in Pomerania in May 1875, and left with him on my return through Berlin for examination, as a 'fibroma molluscum cysticum abdominale.' The patient was a widow, forty years of age. She had been married sixteen years before, and had had one stillborn child two years after marriage. She had been several times at Kreuznach for supposed ovarian disease, and had suffered from considerable prolapsus of the posterior wall of the vagina. By April 1875 the tumour had so much increased that she was tapped by Dr. Kugler of Stettin. A large amount of pus without odour came away, but only partly diminishing the size of the abdomen. Finding on my arrival a very large abdominal tumour only centrally fluctuating, and pressing the perineum and posterior vaginal wall far down between the thighs so that I could not ascertain the state of the uterus, I was in great doubt as to the nature of the case, but at once proceeded to commence an exploratory

operation. Dr. Schönfeld of Labes administered chloroform, and I was ably assisted by Drs. Kugler and Scharlau, both of Stettin. After dividing the abdominal wall to the extent of five inches between the umbilicus and pubes, some loose fat was seen with very large veins, one of which was cut across and bled freely. It was secured by two pressure forceps. Carrying on the incision it passed into the substance of a solid tumour apparently glandular or fibro-plastic; and on pushing one finger onwards, a cavity was opened from which some fifteen to twenty pints of pus escaped with masses of yellowish white curd-like substance. By drawing the back part of this cavity forwards, thus inverting it and pulling upon it, a large solid mass was withdrawn. It had lain behind and to the right side of the uterus in the loose cellular tissue of the pelvis. Its connection with the left side of the uterus behind was first tied and divided, without interference with the left ovary or tube. A similar connection on the right side was secured by a clamp and the tumour was cut away with the right ovary, the fimbriæ and part of the right Fallopian tube. Some other parts of the tumour which were deep in the pelvis behind the peritoneum were then separated and removed. The clamp dragging very much on the uterus and bladder it was taken away, and the included parts secured by transfixion and ligature. The ends of the ligature were brought out through a glass tube, which was left for drainage at the lower end of the wound. Some oozing of blood deep in the pelvis was stopped by torsion. The quantity of fluid removed was 7 litres, the solid matter $10\frac{1}{2}$ pounds, or about 25 pounds in all. The glass tube causing great pain it was removed after three hours. A good deal of red serum had flowed through it and came away after its removal. I left the lady next day going on well, and with the exception of some bladder trouble recovery may be said to have been uninterrupted. I heard of her last year as in excellent health.

Virchow speaks of this fibroma-molluscum as a common formation in the cellular tissue of the pelvis; but in my experience tumours of such character attaining a size calling for surgical treatment are extremely rare.

Tumours described as sub-peritoneal, myxoma-lipomatodes, or lipoma-myxomatodes, have been observed in the sub-

peritoneal tissues and in the mesentery, and cases have been recorded in which, after removal of the abdominal tumour, relapses or secondary formations of similar structure have taken place in the neighbouring glands, or in other organs such as the lungs or liver.

HYDATIDS.

Hydatids growing from some part of the peritoneal surface often acquire an enormous bulk, and distend the abdominal walls in proportion. The displacement of the viscera, the encroachment on the thoracic region, and the coincident interference with the action of the heart and lungs, are as marked as in advanced cases of ovarian disease. But the history of a case of hydatids will commonly show that the dilatation commenced in the upper part of the abdomen, extended next to the hypochondria, and, lastly, to the pelvic region. The growth of hydatids is generally more rapid than that of ovarian cysts. There may be similar irregularities of surface and contour felt by pressure, but the interspaces or depressions between the projecting masses will be more distinguishable in hydatid disease, and are sometimes marked by distinct resonance, when portions of distended intestine happen to be lying in them. The abdominal resonance is more lateral in hydatid disease than in cases of ovarian tumour, but in both cases will be limited to the part in which the bowels are pent up. The fluctuation in hydatids is mostly obscure and circumscribed; but when it can be felt the hydatid fremitus is decisive. It must after all be remembered that hydatids may originate in any part of the peritoneum, and when they happen to do so in the region of the broad ligament the diagnosis will demand additional circumspection.

The best-marked case of hydatids of the peritoneum, as distinguished from hydatid cysts of the liver, which I have seen, was a woman who was in the Samaritan Hospital in 1870–71. The appearance of her abdomen is extremely well shown in the drawing, which has been copied from a photograph taken soon after her admission to the hospital.

The abdomen had all the appearance of a case of multilocular ovarian cyst. Fluctuation was very distinct, but the chief peculiarity of the case was the existence of numerous hard nodules scattered over different parts of the abdominal wall.

They were evidently either attached to the abdominal wall or formed part of it, and at first suggested the belief that they must be scattered nodules of cancer. Some of the best marked of these are shown on the drawing near the umbilicus. They were quite as hard as nodules of hard cancer, and some of them being semi-resonant gave rise to the fear that they might be formed on the coat of intestine; but the fact that the disease was of about twelve years' duration, that the patient had borne healthy children during its progress, that she was not much emaciated, did not suffer from sickness or diarrhœa, nor from much abdominal pain nor tenderness, showed that cancer

might be almost certainly excluded from the diagnosis, even before hydatid fremitus was noticed. This was most distinct, and the diagnosis was completed by the puncture of one of the nodules felt in the abdominal wall with a fine trocar. A little clear fluid escaped, in which the hooklets of the echinococcus were distinctly seen. No very urgent symptoms being present, nothing more was done, and the woman went home. She was afterwards in the Middlesex Hospital under Dr. Murchison, who also pointed out the hydatid fremitus to his class. She again went home, and then, after further enlargement of the

abdomen, and some signs of chronic peritonitis, was readmitted into the Samaritan Hospital, and I determined to attempt the removal of the hydatids. After making an incision of three or four inches in length in the median line below the umbilicus, some free peritoneal fluid escaped, with numbers of hydatid cysts of various sizes, some quite free, but most of them having some attachment to omentum or mesentery. Several groups of them were removed with the attached portions of mesentery, a few small mesenteric vessels requiring ligature. Between three and four pounds of these hydatids, varying in size from a pea to a small apple, were removed. Those in the abdominal wall could not be separated, but I punctured several of the largest, hundreds being still left undisturbed. The wound was closed by suture. No bad symptom followed the operation; on the contrary, considerable relief was given. The patient went home, but I have since ascertained that she died in December 1871. Some of the groups of hydatids were shown at the Pathological Society by Dr. Murchison, and it was considered at the meeting that this was the first instance in which an operation for the removal of peritoneal hydatids had ever been undertaken after the diagnosis had been correctly made.

Although the origin in this case was not clear, it is extremely probable that it was from the liver. Hydatid cysts of the liver having given way, the dispersed progeny had gone on multiplying, and formed attachments in various parts of the peritoneum.

In another woman, thin, anæmic, and of consumptive parentage, sent to the hospital as a case of ovarian disease, I found the abdomen considerably distended, tender and fluctuating, the uterus small and mobile, pressed up forwards and behind the pubes, and Douglas's space occupied by an elastic tumour. The swelling was first noticed about six months before her admission, and four pints of fluid, free in the peritoneum, had been drawn off in the interim. She suffered much, but was relieved by a discharge of pus from the puncture. I made an exploratory incision, and finding the adhesions were so close that it was impossible to make out any cyst wall, I opened a cavity and let out some pints of fetid pus. Then several small cysts attached to the omentum and mesentery were removed, and a larger cavity, apparently Douglas's space, was discovered and more pus evacuated. A long needle was passed up through

the posterior wall of the vagina for drainage. The discharge came freely through the opening, but the temperature rose and she gradually declined till the sixth day of the operation, when she died. The intestines, omentum, and other viscera were matted together and formed a sac containing thin purulent fluid, while the liver and spleen were filled with hydatids. There was a small cyst in the broad ligament on the right side by which the uterus was drawn up in that direction, and on the left side the ovary was masked and the pelvis blocked up by numerous small cysts filled with hard, gristly, calcareous substance evidently of hydatid origin.

Large hydatid cysts of the liver extending low down in the abdomen, or even into the pelvis, have frequently been mistaken for ovarian cysts. In one such case, a young lady who was sent to me by Sir James Clark, I was able, with the assistance of Sir William Jenner, to make an accurate diagnosis, and removed sixty-four ounces of clear fluid from an hydatid cyst which projected downwards from the liver. Two years elapsed before any of this fluid re-collected. I then tapped again, and found only nine ounces in the cyst, the patient being apparently well some few months afterwards. In two similar cases, in the Samaritan Hospital, emptying hydatid cysts of the liver by tapping, assisted by an exhausting syringe, has been followed by what we may confidently hope is a permanent cure. In another case, after tapping, the cyst suppurated, its contents decomposed, the cyst became distended with gas, and I inserted a drainage tube. Daily injections of iodine solution were used, and the patient completely recovered.

Such cases are not likely to be mistaken for ovarian cysts by any one conversant with the signs of hydatid diseases of the liver, so well described by Frerichs and Murchison. The freedom of the pelvis and hypogastric region from the presence of a cyst, and the limitation of the evidences of disease to the upper part of the abdomen, are, of course, the main points of distinction. I have never seen a case of hydatids in the substance of the ovary, and it is curious that these organs seem to be avoided as the seat of parasitic life, for it is probable that in the reported cases it was only by superficial attachment to the peritoneal covering that the hydatids had any relation to the ovary.

PREGNANCY.

Certainly the most common mistakes in the diagnosis of ovarian tumours occur when the uterus is enlarged from some cause, and pregnancy is the most common of all causes of enlargement of the uterus. When a patient has no reason for deceiving her adviser, doubt or difficulty will often arise; and in cases of pregnancy, real or suspected, the patient may mislead the surgeon intentionally, or from her own hopes or fears biassing her judgment. An unmarried girl, or a married woman whose husband is absent, or a widow, may have very strong reasons for concealing pregnancy, and hoping or asserting that she has an ovarian tumour. Or a sterile wife, or one advanced in age, suffering from a tumour, may have grounds almost equally strong for hoping that she may be pregnant. A patient was sent to the Samaritan Hospital, supposed by an experienced surgeon to be suffering from ovarian tumour, but she denied most positively the possibility of pregnancy; and after a premature labour, probably brought on by detection of the imposture, accused my assistant, the late Dr. Ritchie, who was hastily called to her, of having brought a child which was not hers, in order to shield me from the charge of having made a mistake. And in many cases of ovarian tumour patients have believed themselves to be pregnant, medical men have been engaged to attend upon them, and the true nature of the disease has only been detected when the natural period of pregnancy has long passed over.

The diagnosis between an incipient ovarian cyst and pregnancy at an early period is really of no practical importance. There is nothing to be done, and the lapse of time will bring with it the needful evidence. In gestation the proofs will be cumulative and the *dénouement* decisive. At the end of the allotted term, with the exception of the rare cases of extra-uterine encysted conceptions, the question of pregnancy is excluded, and it becomes one of special diagnosis. What kind of tumour is it?

It would be a work of supererogation to recapitulate the well-known indications of pregnancy. But circumscribed enlargement beginning and going on without the marked signs

of pregnancy leads to the suspicion of cystic growth, and to turn this into conviction we have to occupy ourselves with various details connected with the age of the patient, certain malformations of the genital organs, the state of the general health, some functional irregularities, the progress of growth, the configuration of the abdomen, the results of percussion and auscultation, and the manual examination of the uterus. Certain limits of age negative the possibility of conception, although instances are recorded where girls between twelve and fifteen and women up to sixty have borne children. Still, the limits of fifteen and forty-five are very rarely passed. So that in patients very young or very old the presumption must be that a voluminous abdomen is the seat of disease. Again, some malformations of the generative organs render pregnancy impossible; but it must not be forgotten that impregnation has been effected where penetration of the vagina by any solid body was impossible, and in spite of procidentia of the uterus, and of such diseases of the vagina and uterus, vesico-vaginal fistula or uterine cancer, for example, as might appear quite inconsistent with sexual intercourse.

Then the size and position of the swelling and the duration of its growth taken together will influence the diagnosis. A tumour of nine months' certain duration, yet no larger than a uterus at the fourth or fifth month, or one of only four or five months' standing as large as the uterus at the close of pregnancy, will not be attributed to fœtation. In the case of a tumour the history is almost always that of its discovery on one side, and its advance is more or less regular according to its nature, while examples of the displacement of the early gravid uterus are exceptional.

It will be found in the majority of cases of tumour which have lasted long enough, and become large enough superficially to simulate pregnancy, that instead of the ordinary sympathetic disturbance of the functions, the health of the patient has materially given way, especially if the disease be assuming a malignant form; and that owing to the comparative fixity of its base of attachment, and from the want of that mutual adjustment of parts which mitigates the miseries caused by the distending uterus, more than the natural amount of discomfort and pain is encountered. By itself, the absence

or excess of the menstrual flow decides nothing, and the gastric, mammary, and nervous symptoms of pregnancy may also be set up by sympathy with the ovarian irritation. In a case where the question is between pregnancy and ovarian disease, there is hardly time for the modelling out of the peculiar facies ovariana, and in fact no one general symptom can by itself be taken as conclusive; though in most of these consultations the first observation of a patient gives to an experienced eye a right impression as to the real state of matters.

It is very seldom that a growing ovarian cyst, even when unilocular, will leave the symmetry of the abdomen unspoiled. The compound and dermoid forms are almost inevitably lobulated, and give rise to unseemly bosses, with irregularity and distortion of the contour and a great difference in the radiating measurements from the umbilicus. The pointing or flattening of the umbilicus tells nothing as to mere growth, but whenever the prominence is considerable, the ring open, the skin thin and distended, there is almost always fluid free in the peritoneal cavity, and the tumour, if any, which it bathes, is to be otherwise recognized.

The superficial veins of the abdominal wall are seldom so much distended in pregnancy as they often are with large ovarian tumours; but lineæ albicantes are more common in pregnancy. They are seen, however, over all large tumours of rapid growth. When recent they are of a dark purplish colour; when old they are white, glistening, or silvery. When the abdominal wall is œdematous, the lineæ become very prominent. This appearance, common in large solid or semi-solid abdominal tumours, is rare in pregnancy.

It is only when the abdominal wall is very thick, or the fœtus misplaced or dead, that the heart sounds cannot be heard after the sixth month. Sometimes they are masked by the placental murmur, a blowing sound synchronous with the beat of the maternal heart, which is rarely absent in pregnancy, but is very similar to a sound which is common in large fibroids of the uterus, but very rarely perceptible in ovarian tumours. The aortic sound and impulse of the mother, being perceptible both in pregnancy and in many uterine and ovarian tumours, are of very little diagnostic value.

Up to the fifth month the pregnant uterus gives no sense of

fluctuation; it has rather the consistence of a glandular or fatty tumour. After the fifth month the sensation conveyed to the finger is that of displacement of fluid, allowing a hard body to be felt. This is the fœtus, which from the sixth to the ninth lunar month may be pushed from side to side. After the seventh month it is often possible to trace the general outline of the fœtus so clearly that no mistake can be made. But when the abdominal wall is thick, some of the more solid varieties of ovarian tumour may very closely resemble the shape of a fœtus. An ovarian tumour surrounded by ascitic fluid, or a mass of small cysts projecting into a large one, may be moved very much like a fœtus in the liquor amnii. But the independent movements of the fœtus are very characteristic, and, if felt, conclusive. Sometimes, however, with a living child these movements cannot be felt; and if the child is dead, of course they cannot be made.

There are no ovarian tumours which give exactly the same sensation as the ballottement of the fœtus in utero, though internal like external ballottement may be simulated by a hard tumour floating in ascitic fluid, or by a large cyst containing internal projections. The movements of a cyst with a long pedicle could hardly be mistaken for those of the uterus, as the corresponding vaginal touch will indicate its independence. The effect which tumours mechanically make upon the position and form of the uterus do not much resemble those of pregnancy, and with the usually open state of the os in ovarian disease, nothing can invalidate the evidence of the sound. One thing, at any rate, is certain, that in a case of disputed pregnancy the symptoms can rarely be so urgent as to require immediate operation. With the least doubt, therefore, the best policy is to wait.

Happily, cases of malplaced fœtation are comparatively unfrequent. It is not clear which is the most common point of attachment of the errant ovum. It is admittedly almost impossible to determine the portion of the genital tract in which the ovum is being developed during the life of the patient. Hecker states that these pregnancies are mostly abdominal; Parry, that he finds the greater number recorded as tubal. Wherever they may be, and however much they may physically resemble an incipient ovarian cyst, the early diagnosis will very much depend

upon the indications of conception. These are absent in the case of ovarian disease, and there are not the distressing symptoms, such as hypogastric colicky pains, vaginal hæmorrhages, with sometimes discharge of decidua, nor the curious moral condition in which the woman persistently believes herself *enceinte* which accompany these irregular fœtations. More commonly than not, the diagnostic problem finds its solution in the early death of the subject. If she should survive the third or fourth month, the probability is that the gestation is abdominal. Seventy-six out of 132 cases noted by Hecker escaped. The attention will then be turned to other matters. The detection of the fœtal form, its movements, ballottement, the sounds of the heart and the placental murmur will at once settle the question of ovarian tumour. Still later, or at the full term, the signs of a spurious labour, followed by diminution of size, will influence a decision. If, after this, the process of encystment should continue, the tumour resulting may be either fluctuating or solid. With an accumulation of fluid in the amnion, and consequently no diminution of size, one must resort to abdominal ballottement, with the patient on hands and knees; and in that position there is no doubt the remains of the fœtus would be felt. But between a solid mass of a date longer than the nine months of pregnancy and an ovarian tumour, judgment will be mainly influenced by the absence of the symptoms of pregnancy during the early stages of development, the absence of false labour at or near the end of the natural term, and the steady regular increase in size after the usual period of gestation has passed. Finally, it is self-evident that no ovarian cyst except a dermoid can come into competition with one of these conceptions which has had the privilege of more than half a century of incubation, and has degenerated into a substantial lardaceous compound, or established a claim to the pompous appellation of lithopædion.

The greatest difficulty in diagnosis arises when the uterus either undoubtedly contains something, or is enlarged as in pregnancy. The so-called moles or hydatids, which are really hydatidiform degeneration of the chorion—intra-uterine polypus—cancer of the body and fundus of the uterus, while the cervix remains unaffected—hæmatometra, hydrometra, and physometra—are all conditions which must be borne in mind,

and which may resemble ovarian tumours in some particulars, pregnancy in others.

If the uterus instead of a fœtus should contain a mole, the breasts may swell, the catamenia cease, and all the other signs of pregnancy may be present for a time. Usually molar pregnancy comes to an end about the third or fourth month, but cases are on record where it has been protracted to the thirteenth and fourteenth months; and Churchill alludes to a case where an unmarried woman had a frequent discharge of 'uterine hydatids' throughout her menstrual life. In molar pregnancy the uterus does not enlarge so regularly as in ordinary pregnancy. The enlargement is usually more rapid, and the functional disorders are more intense. I once saw a woman fully as large as at the end of a normal pregnancy, with a supposed ovarian cyst. While we were examining her in the outpatients' room, uterine contraction came on; and with very little help by fingers in the vagina and pressure on the abdomen, nearly a whole pailful of these 'hydatids' were expelled.

An intra-uterine polypus has often been mistaken for pregnancy. After the dilatation of the cervical canal, and commencing expulsion from the os, it has even been supposed that abortion or labour was going on. But it is not likely that this condition would be mistaken for ovarian disease.

Cancer of the body and fundus of the uterus, causing enlargement above while the cervix is unaffected, may be taken for an ovarian cyst which is lying above the uterus, or for pregnancy. But the general cachexia, uterine discharge, and absence of fluctuation will be sufficient to distinguish this condition from ovarian disease, and some of the characteristic signs of pregnancy are certain to be absent.

Collections of blood, or retained clot, the so-called fibrinous polypi, or of masses of dysmenorrhœal membrane with blood or clot, all conditions described as hæmatometra, are more likely to be mistaken for pregnancy than for ovarian disease; but some of the signs of pregnancy will certainly be wanting, and the signs of enlargement of the uterus are sufficient to distinguish this condition from ovarian disease.

Hydrometra, again, is recognized by the enlargement of the uterus without the other characteristic signs of pregnancy, before any watery discharge clears up doubt. Many supposed

cases of hydrometra have undoubtedly been cases of ovarian cysts emptying themselves through the Fallopian tube into the uterus and vagina.

Physometra is a very rare condition—generally the result of decomposition of part of a retained ovum, or of blood clot. The resonance on percussion of the enlarged uterus is sufficiently characteristic.

Now bearing in mind the various symptoms and signs of pregnancy while the uterus is still a pelvic tumour, and afterwards when the uterus has enlarged, risen, and become an abdominal tumour, it will be seen how they resemble and how they differ from those which characterise ovarian cysts and tumours, uterine tumours, and extra-uterine fœtation.

When an ovary is only slightly tumefied, it usually lies behind the uterus and may be felt by vagina or rectum, or better still by combined examination with one finger in the rectum and one in the vagina. It does not at all resemble the enlarging uterus of early pregnancy. As the ovary swells, it usually rises up out of the pelvis; but it sometimes remains low down either from pressure or adhesion, and as it grows it pushes the uterus either to one side, or backwards, or forwards. It may restrict the mobility of the uterus, but the independence of the one of the other may generally be made out. Increasing in size, it may rise into the abdomen and leave the uterus quite in its normal position, without any deviation or modification of mobility, or alteration in the cervix, or it may drag up the uterus quite out of reach, elongating the vagina, so that nothing but the ovarian tumour can be felt through the vaginal walls; or the os may just be reached, high up above the pubes if the ovarian cyst is behind the uterus, or near the promontory of the sacrum if the cyst is in front. This displacement of the os backwards by a cyst in front of it simulates pregnancy, but other signs are wanting. In case of doubt, delay of a month or two would clear it up.

It is possible that the rate of growth of an ovarian tumour may closely resemble the rate of the enlargement of the uterus in pregnancy; but it is much more likely to advance at a very different and much less regular rate, and to remain for weeks or months without much alteration in size. The fœtal movements

and heart sounds are wanting, and there is probably a less dense or solid, if not a distinctly fluctuating tumour.

The distinction between pregnancy and fibroid tumour or enlargement of the uterus will be alluded to hereafter.

RENAL CYSTS AND TUMOURS.

The diagnosis of ovarian tumours from cystic growths and enlargements of the kidneys is made repeatedly, in hospital and private practice, with a readiness and certainty which render a mistake quite an exception in a large number of accurate opinions. But exceptions still occur; and men of great experience must occasionally admit that an exact diagnosis is impossible. In other cases, it is only after an exploratory or incomplete operation, or after the death of the patient, that a mistake is discovered, and the means of avoiding it for the future are learned.

The first case of the kind which came under my care was one of

Soft cancer of the right kidney in a girl only four years old. She was sent up from the country to me, in 1862, supposed to be suffering from ovarian disease. Her appearance is very well shown in the woodcut on the opposite page, copied from a photograph, taken by Dr. Wright whilst she was in the Samaritan Hospital.

The diagnosis in this case was made without much difficulty, although the urine was quite normal. The growth was extremely rapid; hardly six months from its commencement to its fatal termination—when the diseased mass weighed between sixteen and seventeen pounds. The tumour occupied the whole of the right side of the abdomen, bulging backwards in the right loin. It was uniformly elastic, but no fluctuation could be detected. The intestines were pushed downwards, and to the left side. The rapid growth, and the absence of fluctuation, were, of course, strongly against the opinion that the tumour was ovarian; while the rarity of ovarian disease in young children, and the comparative frequency of renal encephaloid, led to a diagnosis which was confirmed by a puncture with a fine exploring needle. A few drops of reddish serum were obtained, containing nucleated cells of varied size and shape. I sent the child home, with a note to Dr. Williamson,

of Nantwich, expressing my opinion that the tumour was a mass of soft cancer, and that the right kidney was the most probable seat of the disease. This proved to be correct. Dr. Williamson sent me the specimen, and I exhibited it at the Pathological Society, in December 1862. The whole kidney was infiltrated with encephaloid. Although so enormously enlarged, the shape of a normal kidney was distinctly preserved. Its surface was soft and elastic, in some spots giving a sense of deep-seated fluctuation; but no cyst was found, nor were there

any marks of suppuration or hæmorrhage. Coils of small intestine adhered to its inner and under surface. The ureter was completely occluded by the pressure of the tumour. The left kidney was quite healthy. Thus the normal condition of the urine was explained. The diseased kidney added nothing to the contents of the bladder, and the healthy kidney supplied only normal urine.

The following remarks on this point by Dr. Roberts, of Manchester (*Urinary and Renal Diseases*, p. 444), are well worthy of serious consideration. He says: 'The presence of cancer cells in the urine is a sign which usually figures prominently

in the catalogue of symptoms of renal cancer, but its value is very doubtful. In all the later cases, especially where there was hæmaturia, the urine was carefully examined for cancer cells, but without success. Rosenstein mentions a case in which a cancerous villus was actually found projecting into the ureter, yet no cancer cells could be detected in the urine during life. It is by no means an easy matter to identify cancer cells in the urine, in consequence of their similarity to the transitional epithelium of the pelvis and ureter. . . . In two examples of renal cancer, with hæmaturia, which I have had an opportunity of observing, repeated and careful examination of the urine failed to discover the presence of cancer cells. Mr. Moore (*Med. Chir. Trans.* xxxv. 466) believes that he succeeded in identifying cancer cells in the urine drawn after death from the bladder of a man in whose kidneys cancerous nodules were found; but his description rather accords with the appearance of the epithelial cells which are always freely detached from the vesical mucous membrane after death.'

Whether renal cancer be observed in children or in adults—whether it be or be not accompanied by hæmaturia, or by the presence in the urine of albumen, or of epithelial cells from the ureter and pelvis of the kidney—whether the progress of the disease be slow or rapid—whether there may be much, little, or no pain, or emaciation, or gastric symptoms—or great or little effect upon the general health—the abdominal tumour is the most prominent characteristic of the disease. As Bright observed (*Abdominal Tumours*—Sydenham Society's Edit. p. 199): 'The enlargement shows itself much more towards the anterior part of the abdomen than towards the loins.' It is, however, more or less confined to one side of the abdomen and to the corresponding lumbar region, whence, as a rule, it is immovable—and equally, as a rule, some portion of the intestines are fixed in front of it. But in one extraordinary case an exception was found to both these rules. In the "Lancet" of March 18, 1865, a case is recorded in which an operation was commenced for the removal of a supposed tumour of the left ovary. The patient was in one of our general hospitals, and it was believed by the eminent physician-accoucheur who carefully examined her, and by the skilful surgeon who performed

the operation, that 'the tumour was ovarian, and that from its great mobility, and the absence of adhesions, its removal would be easy.' Yet the uterus and ovary were found to be healthy, and the tumour to be the enlarged left kidney; which, instead of being fixed, was movable—its peritoneal covering being elongated into a sort of mesentery, admitting of free movements—and, instead of pushing the intestines before it, the descending colon and sigmoid flexure were behind it. This enlargement of a movable kidney added greatly to the difficulty of diagnosis. A movable kidney not enlarged could hardly be mistaken for an ovarian tumour.

The *absence of fluctuation* is the leading sign by which cancerous or other *solid* tumours of the kidneys are distinguished from ovarian tumours; for it is extremely rare to find a large ovarian tumour in some part of which fluctuation cannot be detected. But in some forms of kidney disease fluctuation is as evident as in ovarian cysts. It was perceptible in the following case of

Pyonephrosis of the Right Kidney, with Impaction of Two Calculi in the Ureter.

On May 16, 1865, I was hurriedly called to see the mother of a patient upon whom I had performed ovariotomy successfully, the daughter telling me that her mother had a tumour like that which I had removed from herself. I found the patient in excessive pain all over the abdomen, but greater on the right side and in the right loin; and I felt a hard tumour between the right false ribs and the right ilium, reaching forward to within an inch or two of the umbilicus.

The patient was so ill that I could not get any sort of history from her. I prescribed a full opiate, and directed it to be repeated in smaller doses at intervals of an hour until the pain abated—hot poultices being also applied. On the next day she was much easier, and I gathered the following history.

She was fifty years of age; had married when twenty-two; had borne five children. Her last child was seventeen years old. Before the last confinement her health had been very good. This labour was very protracted, the presentation having

been transverse. Ever since, she had been subject at times to pain in the back and right loin. It used to come on suddenly, increase in violence, and produce shivering and nausea. After six or eight hours it would cease. Her urine at the time of the attacks was usually thick, with a yellowish sediment; at other times it was clear. For five years such attacks recurred pretty regularly every six weeks. Then, after a more active life, they recurred more frequently, scarcely a week intervening from one to another. In 1860 the catamenia ceased, and the attacks became milder and less frequent, and she was entirely free for a year or more. In 1862 the pains suddenly recurred with more violence than ever. After great suffering for several hours 'a dozen or two of little stones, as large as a pin's head,' were passed with the urine. From that time to the present attack she had been quite well. On May 8, 1865, while out walking, she stumbled and fell upon her abdomen. She was lifted up, complaining of great abdominal pain. She got home, went to bed, and next day the pain was so great that she was unable to get up. During the next six days she passed a good deal of blood in the urine, and she perceived, for the first time, a tumour as large as a cricket ball in the right side of the abdomen. On the 15th the pain, which had almost ceased, returned suddenly with great violence, and I was sent for. She was much relieved by the opiate prescribed; and I made a more careful examination of the tumour. It could be felt below the right false ribs, but its margins could not be made out very distinctly. They appeared to be overlapped, on the right by the cæcum, and the left by small intestine. Wherever the tumour could be distinctly felt, it gave a dull note on moderately strong percussion, but a clear one on deeper pressure and sharper percussion. By pressure forwards with one hand on the right loin, while the other was on the front of the tumour, a trace of fluctuation was detected. Pain was kept in check by opiates, and on May 19th there was a prominent point near the middle of the tumour. Fluctuation being distinct, I inserted a very fine trocar at this point (which was midway between the umbilicus and right anterior superior spine of the ilium), and drew off between two and three pints of thin pus, by a syringe attached to the canula by an air-tight joint. The urine, before the tapping, had been clear, but the day after it

was found by Dr. De Mussy to be loaded with pus. On the 21st the late Dr. Ritchie reported that it contained a large quantity of pus altered by the action of the urine. On the 27th, notwithstanding this escape of pus through the bladder, the tumour was as large as before the tapping. I therefore tapped again, and after removing two pints of pus, left the wound unclosed. There being no discharge after two days, I inserted a laminaria tent, having re-opened the wound with the lancet.

A very free discharge went on for the next fortnight. At first it was purulent, but afterwards it consisted of clear fluid, which was found to contain urea by Dr. Leared. The pain ceased, and the general health rapidly improved. The urine became clear and free from pus. On the night of June 17th some abdominal pain came on, but soon subsided, and the discharge from the opening suddenly ceased. Urine was passed with smarting, and was again found to contain pus, mingled with a little blood. Early in the morning of June 20th great desire was felt to pass water. After much difficulty and pain a calculus of uric acid and urate of ammonia, as large as a broad bean, and much of the same shape, was passed, and was soon followed by a second of similar dimensions. Relief was immediate. On the 25th a boil was felt just at the seat of the former punctures. On the 27th it burst, discharging about two ounces of grumous matter. The patient now felt so well that she was able to walk about and enjoy herself in the country. On the 1st of July there was still a little discharge, perhaps one ounce in twenty-four hours. The abdomen was everywhere clear on percussion; but on deep pressure a hard painless tumour, as large as an orange, was to be felt in the right loin. After a few weeks this could no longer be felt. She died in 1880 after several years of good health.

This case is in many respects very instructive. The patient probably had a tendency to deposit uric acid before her last labour. The effects of that protracted labour led perhaps to the train of symptoms which ended, for a time, in the passage of numerous small calculi. Then, in 1863 or 1864, two renal calculi began to form, and set up chronic pyelitis. The fall in 1865 dislodged the calculi, and they blocked up the ureter. The pus and urine accumulated behind the calculi, and distended the pelvis of the kidney into the cavity from which I

removed the large quantity of pus at the first tapping; and it was not till the calculi passed on into the bladder and left the ureter free that the formation of pus ceased and the artificial opening closed.

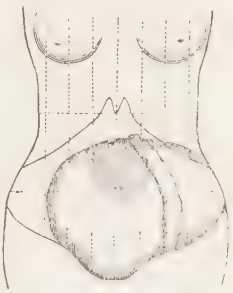
I have twice opened peri-renal abscesses in the loin, and in one case removed a small renal calculus through the opening. I have cured a large cyst of the right kidney by tapping through the loin and draining. But the case just related is the only one in which I have punctured the kidney through the abdominal wall. It was a hazardous proceeding, but the danger of rupture of the rapidly increasing sac appeared to be so great, and the suffering was so excessive, that tapping seemed to be less dangerous than expectation.

The following case of *Cystic Degeneration of the Left Kidney*, which was mistaken for a cyst of the left ovary, is not less instructive :—

On October 10, 1866, a married woman, 43 years of age, called upon me with a letter from Dr. M'Donnell, of Stoke Newington, containing a very full and accurate history of her case. She had been married twenty-five years, and had nine children, the eldest being 23 and the youngest four years old. She had also had one premature birth, and two abortions; the last in 1861. Dr. M'Donnell wrote as follows: 'In April 1862 she sought my advice for a hard swelling situated in the hypogastric and left iliac regions, the size of an infant's head. Examination externally, and *per vaginam*, convinced me it was an ovarian tumour. Mr. Solly confirmed this opinion on May 8, 1863. In 1854 and 1855 a swelling was complained of, and had been the subject of conversation between husband and wife, but no advice was asked for at the time. Its situation was much as in 1863. Aching pain was felt, from time to time, in the tumour without causing any alarm, from the time when it was first noticed by the patient herself. It had increased so much in the early part of 1863 as to suggest the question of pregnancy. Some pain has at times been complained of in the lumbar region, and the lower part of the abdomen, relieved by leeches, fomentations, &c. Leeches have been applied several times, the first time in November 1863. In the summer of 1863 the patient began to attend the Hospital for Women in Soho Square, and became an in-patient in January 1866, with

a view to operation, but no operation was performed. She remained in hospital twelve weeks, her general health being then very bad, and she was much reduced in flesh and strength. After she left the hospital the tumour increased in size, extended to the epigastrium, and encroached so much on the chest as greatly to impede the breathing, and even prevent her moving about in bed. Assisted by Mr. Forman, of Stoke Newington, on August 4, 1866, I withdrew, by tapping in the linea alba, two gallons of dark discoloured fluid, of the consistence of pea soup. The opening was made midway between umbilicus and pubes. The operation was well borne; the abdomen was entirely freed from fluid, the resonance being tympanitic everywhere, and no solid tumour to be felt in the pelvis. She recovered very favourably, and has been frequently out of doors since that time. The appetite, which had been entirely wanting for months previously, became for a short time very good. Her strength and spirits have much improved, though the cyst has re-filled.'

It was rather more than two months after this tapping when I first saw the patient, and I then advised her to come into hospital before she became as much distressed as she had been before the tapping. She was admitted on December 17, 1866. The tumour then occupied the position shown in the annexed diagram. At the upper and central part there was a patch of crepitus, giving the feeling of adhering omentum; and all down the front of the tumour, about an inch to the left of the umbilicus, was a cord-like ridge, which was taken by some who examined it for intestine, though it felt very like a large, long, and thick Fallopian tube. The measurements were: Girth at the umbilical level, 36 inches; from umbilicus to ensiform cartilage, 9 inches; to symphysis pubis, 7½ inches; to right ilium, 9 inches; and to left ilium, 9½ inches. There was some mobility in the tumour, both vertically and laterally. Fluctuation was distinct across the whole tumour, in all directions. The left loin was dull on percussion, the right tympanitic. The uterus was high, the os hard and fissured, admitting the tip of the



finger; the cervix short. No part of the tumour was below the brim of the pelvis. The catamenia were expected in a few days. They recurred regularly every three weeks—lasting five days. Dr. Junker examined the urine and reported—'No albumen; deposits—urates, mucus, and epithelium.' She was subject to occasional nervous attacks, during which she was partially unconscious. She said they began by palpitation. She had four while in hospital; but they were regarded as hysterical, and attracted little attention. The heart and lungs appeared to be healthy. The catamenia came on, and lasted a week, ceasing on December 29; and on January 3, 1867, chloroform having been administered by Dr. Junker, I made an incision five inches long, extending downwards along the linea alba, from one inch below the umbilicus. On opening the peritoneum, I at once found that the hard roll, or ridge, observed running down the front of the tumour, was part of the transverse and descending colon, adhering closely by means of the meso-colon and omentum, both to the cyst and to the abdominal wall. I separated some of these attachments, in order to tap the cyst safely. On introducing the trocar, about fifteen pints of fluid escaped. It had the appearance of pea soup. When the cyst was empty I made some further separation of omentum and intestine; and when passing my hand round the right side of the cyst, what appeared to be another cyst gave way, and between one and two pints of clear fluid escaped. I then found that the deep attachments of the cyst were too close to admit of separation; and after tying three vessels which were bleeding in the separated omentum, and cutting off the ligatures short, I closed the wound.

The patient rallied slowly from the chloroform, and complained of pain, which was relieved by an opiate. Two other opiates were given at night—the total quantity given amounting to 50 minims of laudanum. Three hours after operation a small quantity of clear urine was drawn off by the catheter. After this not a drop of urine entered the bladder. At 10 P.M. the temperature was 98·4°; pulse 116; respiration 28. The next morning the pulse was 120, and very feeble; skin dry; temperature 98°; respiration 30. She was comatose, but easily roused, and answered questions sensibly. The coma

gradually became more profound, and she died thirty hours after operation.

On examining the body seventeen hours after death there was no *rigor mortis*. The wound had united well. There were about four pints of blood-red serum, and a small tea-cupful of blood-clot in the peritoneal cavity. The right kidney was enlarged, and very soft; the cortical substance very friable, pale yellow in colour. The calyces and pelvis were much dilated; and the thin sac formed by this dilatation had given way longitudinally. A calculus, weighing forty grains, was in one of the calyces, forming a perfect cast of the calyx. The bladder was contracted and empty. The uterus and ovaries were healthy. The left kidney formed the cystic tumour, which is described as follows by Dr. Junker:—

'The left kidney formed a cyst larger than an adult head. It presented one large cavity, composed of several wide pouches, arranged vertically at one side of the principal cavity. The stroma which formed the external wall was of varying thickness; thicker and stronger at the base of the pouches; thinner and less dense around the main cyst. It had a serous external coat; at some places hypertrophied, at others atrophied. Next a fibrous structure (fibrous capsule of the kidney). This was followed by what appears to have been the cortical substance of the kidney, and from which portions could be traced into the septa (the former columnæ Bertini) which separated the pouches (the expanded calyces). The main cyst (the original pelvis) was formed by the peritoneal and fibrous capsules. The medullary portion could not be well distinguished by the naked eye from the thickened lining membrane. Thus the tumour appears to be a good specimen of genuine hydronephrosis, in which pelvis and calyces expand into a large cavity, and produce by pressure atrophy of the original structures of the organ.

'The peritoneal coat was rough with shreds of the broken-down, extensive, and intimate adhesions. Some of the neighbouring organs, or portions of them, were so intimately connected with the tumour that their separation was impossible, and portions had to be cut off in order to remove the cyst. Such connexions existed between the spleen, the head of pancreas, the great curvature of stomach, principally at the

pyloric end, the duodenum, a part of the left lobe of liver, coils of small intestine, omentum and mesentery, and along the entire extent of the vertebral column, as low as the second lumbar vertebra to these bodies, and their left transverse processes, and to the right transverse processes of most of the dorsal vertebræ. No adhesions, however, existed between the tumour and the bladder, uterus and its appendages, or the rectum.'

After the information obtained by the post-mortem examination, I made further inquiry into the history of the case, especially as to the state of the urine, and I learned from Mr. Scott that while the patient was under his care in the Hospital for Women, in January 1869, the urine contained pus and albumen, was alkaline, and of low specific gravity, about 1005. He had 'no doubt of the tumour being ovarian, but considered the case an unfavourable one for operation, believing the front of the tumour was crossed by a loop of intestine which would, in all probability, be firmly adherent throughout its course; from the certainty of considerable adhesion, in consequence of the repeated attacks of inflammation; and from the presence of pus and albumen in the urine, with a feeble circulation. The quantity of pus varied considerably during her stay in hospital; albumen was pretty constantly present.' Dr. M'Donnell has ascertained that, when twelve or fourteen years old, she was struck by an iron shovel with great violence on the abdomen, near the left ilium. 'She was felled on the spot, and remained insensible for some (indefinite) time. She was ill afterwards, and attended at St. Bartholomew's and other hospitals for eighteen months as out patient. She told her husband that during all this time she "suffered much from the urine," but did not explain more precisely the nature of the suffering; for four or five years subsequent to the first period of eighteen months, and for a like period during the first years of married life, she suffered pain and distress, referred to this injury. Her pregnancies were always attended with distress—indeed, during her whole married life, twenty-six years, she repeatedly suffered from deep-seated pain in the abdomen where the injury was inflicted.'

A single lady, 59 years of age, first consulted me in June 1865. She then had a tumour which filled all the left

side of the abdomen and extended upwards under the left false ribs. It had been observed for nearly two years, but its increase had only been rapid for about six months. In August 1866 fluctuation was detected in the upper part of the tumour, and five or six pints of yellowish pyoid fluid, with mucous flakes floating in it, were removed by tapping. A roll of intestine adhered to the upper part of the tumour on the right side. Relief followed the tapping for a time; but a second tapping was necessary in November. The true nature of the tumour then became apparent. The presence of intestine in front of the tumour, and the limitation of the tumour to the left side of the abdomen, while the uterus was freely movable, were the chief guides in diagnosis, as the urine was normal, and there was nothing characteristic in the fluid removed by tapping. In April 1867 the patient fell when out walking, and ruptured the cyst. She died twenty-eight hours afterwards; and Dr. Morton, of the Abbey Road, found a large quantity of turbid fluid in the peritoneal cavity, corresponding with similar fluid found in a large ruptured cyst of the left kidney. The renal tumour filled all the left half of the abdominal cavity. Its lower end dipped down into the pelvis, but was quite free. Its upper end adhered to the spleen. The ruptured cyst contained, besides the fluid, a quantity of very thick viscid mucus, and seven calculi of varied chemical composition. The largest was an inch and a half in its long diameter; the smallest was as large as a hazel nut; two were smooth; five were rough, and very irregular in outline. One calculus was loose in the cavity, as well as a quantity of lithic acid gravel. The other calculi were imbedded in the pelvis and dilated calyces. The ureter was completely occluded, and no communication could be found with the bladder. The right kidney was slightly enlarged. The uterus and its appendages were healthy. The calculi are in the Museum of the College of Surgeons.

The case now to be related shows the difficulty of diagnosis arising from the enormous bulk which effectually obscured all the indications to be gathered from manipulation, either externally or by the vagina. A single woman, aged 35, was admitted into the Samaritan Hospital in December 1870, with the abdomen greatly enlarged. The dimensions were,

girth at umbilical level, 60 inches; from ensiform cartilage to umbilicus, 14 inches; from umbilicus to symphysis pubis, 14 inches; from right ant. sup. sp. of ilium to umbilicus, 16 inches; from left do. to umbilicus, 21 inches. There was extreme œdema of the abdominal walls, which were very thick, not marked with the lineæ albicantes, and showed only a few dilated veins. The skin was red and tender, but not painful on pressure. The fluctuation was scarcely perceptible, and only doubtful in the lower part of the abdomen; there was no crepitus, and the sounds on percussion were dull all over the swelling. The uterus appeared to be small, normal in size, and movable. No tumour could be felt in the pelvis. Some years ago she had been treated with iodine for bronchocele. She said she was pretty well a year before, though she had been subject at times to swelling of the body, which went down again. About Easter 1870 she began to suffer from dyspnœa and anasarca of the legs, and the body was found to be permanently increasing in size. She maintained that the dyspnœa and anasarca preceded the abdominal swelling. Since that time she has gradually attained her present size, with very great suffering. The tumefaction of the abdominal walls was too great to admit of any satisfactory diagnosis as to the nature of the tumour. This could be only ascertained by an exploratory incision, which was accordingly made between the umbilicus and symphysis pubis to the extent of six inches. Much serous fluid escaped, and three or four superficial vessels were tied. Four or five pints of clear serum flowed out when the peritoneal cavity was opened, and a solid tumour was exposed, very firmly adherent and vascular on its surface. One large vein at the upper part bled so freely that, after vainly trying to apply ligatures (for the soft granular tissue gave way before the silk), I used the actual cautery and solid perchloride of iron. The wound was closed with sutures and long bands of strapping. It did not unite well, and after two or three weeks it opened, and allowed the tumour to protrude a little. There was continued drainage of serum from the gaping incision, and from punctures made at various times in the legs and thighs, which relieved the urgent dyspnœa and prolonged life, but the patient gradually got weaker, and died eight weeks after the operation.

The tumour was found adherent to the abdominal walls, to the liver, omentum, and descending colon. Behind, it was inseparably connected with the right kidney, which had to be removed with it. The tumour alone weighed eighty-four pounds. The uterus and both ovaries were healthy. Dr. Wilson Fox reported that the tumour was 'fibro-plastic,' that the right kidney could only be separated from it by careful dissection, and that it probably originated in the kidney, or in the peritoneum covering it. Portions of the tumour are preserved in the Museum of University College.

Another case of great practical interest is that of a girl in her sixteenth year, who was sent to me by Dr. Wardell, of Tunbridge Wells, on account of an abdominal tumour. She was a fat, florid girl, and apparently in robust health; but her abdomen began to enlarge when she was about twelve years old, and went on increasing, not attracting any particular notice till May or June 1871, when she was seized with some pain on the right side. This lasted only a few hours, and was followed by swelling, also on the right side, which disappeared after some days' rest, the general enlargement remaining. Dr. Wardell first wrote to me about her in October 1871. A month later he wrote that the tumour was enlarging, and she was admitted into the Samaritan Hospital early in December. On December 15, the girth at the umbilical level was 35 inches, distance from sternum to pubes 15 inches, and from one ilium to the other, across the front of the abdomen, 15½ inches. Fluctuation was distinct all over the lower part of the abdomen, and the movement of a cyst was distinctly visible between the umbilicus and sternum—rising and sinking with the respiratory movements—the upper border of the cyst being about half-way between the sternum and the umbilicus. On both sides of the abdomen the sound was dull on percussion; so it was from the pubes to within two inches of the umbilicus. From thence to the upper border of the cyst in the centre it was resonant or tympanitic, and on pressure with the fingers the peculiar gurgling and contraction of intestine could be felt. It was quite clear, therefore, that we had intestine adhering in front to the upper part of the cyst. Both loins and flanks were clear on percussion, the right more distinctly so than the left. The uterus was normal in size and situation. On the right side of the

vagina a soft fluctuating mass (the lower part of the cyst) could be felt just above the brim of the pelvis. The catamenia appeared when she was fourteen, and continued regular for four months, then ceased for four months, and since then have been regular, but rather excessive, lasting a week. There was some irritability of bladder. Very unfortunately, owing to a mistake, the urine was not examined.

The girl was kept in hospital, and on January 23, 1872, the girth had increased to thirty-seven inches, and each of the other measurements showed an increase of about an inch. The presence of intestine in front of the cyst led to the suspicion of hydronephrosis; but the resonance of both loins, and the fact that the cyst could be felt by the vagina on the right side, almost negatived this suspicion, and it appeared more probable that we had to deal with a multilocular ovarian cyst, to which intestine adhered in front. I made an exploratory incision on January 24, and at once came upon the cæcum, its appendix, and the ascending colon, which had been pushed upwards and across the median line by the cyst, which was behind it. I saw at once I had to deal with a hydronephrosis; so, pushing aside the intestine, I tapped the cyst. Twelve pints of fluid escaped through the canula, and I then found that the uterus and both ovaries were healthy. When the cyst was empty, I fixed the opening in its wall to the abdominal wall by a harelip-pin, and then closed the wounds by sutures. A small cyst in each broad ligament I felt, but did not disturb.

The fluid removed from the cyst was clear, light yellow in colour, with a faint urinous odour, acid reaction, and specific gravity of 1006. On standing, a few flocculent clouds formed, and some red blood-corpuscles were deposited. On careful chemical examination, urea, urates, and chlorides were found in about the normal proportions of healthy urine. There were traces of uric acid. A very small amount of albumen and phosphates, but no traces of sugar could be detected. On microscopic examination of the deposit large numbers of red blood-corpuscles were seen, a few pus cells, some squamous epithelial cells, and granular cells, but neither tube-casts nor crystals.

The case so far as it assists in the study of diagnosis might end here, but the fever which followed the operation and caused her death on the fourth day was so remarkable that I

may refer those interested in the subject to a lecture on the case which was published in April 1872, in the 'Medical Times and Gazette.'

It is evident from the cases just narrated that both solid and cystic tumours of the kidney may be mistaken for ovarian tumours. Solid renal tumours, whether cancerous or innocent, may resemble the malignant, pseudo-colloid, or cysto-sarcomatous tumours of the ovaries; while different varieties of ovarian cysts may be closely simulated by different forms of pyelitis and pyonephrosis, hydronephrosis, cystic degeneration, and the growth of hydatids in the kidney. Perhaps the diagnosis may be facilitated by attention to the following propositions:—

1. Although intestine is sometimes found in front of ovarian tumours, and sometimes behind movable renal tumours, these are very rare exceptions to the general rule that renal tumours press the intestines forward, and ovarian tumours press them backward. In other words, ovarian tumours are in front of the intestines, renal tumours are behind the intestines.

2. Large tumours of the right kidney usually have the ascending colon on the inner border of the tumour. Tumours of the left kidney are usually crossed from above downwards by the descending colon.

3. The discovery of intestine in front of a doubtful abdominal tumour should lead to a careful examination of the urine. It is possible that one kidney may be diseased and the urine quite normal, because the healthy kidney alone secretes urine. But the rule is that either blood, pus, or albumen, or characteristic epithelium, is detected—or some history may be elicited of their having been detected at some former period.

4. If any doubt be entertained whether a substance felt between an abdominal tumour and the integument be or be not intestine, percussion will not always solve the doubt, because the intestine may be empty and compressed. But (*a*) an intestine when rolled under the fingers contracts into a firm, cord-like, movable roll; (*b*) the patient may be conscious of the gurgling of flatus along it, or the gurgling may be heard on auscultation; (*c*) the intestine may be distended by insufflation, after passing a long elastic tube through the rectum.

5. Ovarian and renal cysts may both be subject to great alterations in size. When the kidney is the seat of disease the fluid usually escapes by the ureter and bladder. An ovarian cyst can only empty itself through the bladder after adhesion and a fistulous opening. It may discharge through the Fallopian tube and uterus, or into an intestine, or through the coats of the vagina. In either case the physical and chemical characters of the fluid discharged will be the chief guide in diagnosis.

6. If a correct history can be obtained, it may be expected that a renal tumour has first been detected between the false ribs and ilium, and that it has extended first toward the umbilicus, next into the hypochondrium, and lastly downwards towards the groin. An ovarian tumour has, in all probability, been first noticed in one inguinal or iliac region, and has extended upwards and inwards.

7. It is only a very small ovarian tumour, with a long pedicle, which could be mistaken for a floating or movable kidney. The latter may be recognised by its characteristic shape, though it is often so misplaced that the hilus is turned upwards. The kidney is usually felt between the umbilicus and the false ribs, and may be pushed upwards and downwards, or laterally, to a varying extent, or into the lumbar region to the normal position of the kidney. When the kidney is pushed away from this position, the sound on percussion becomes tympanitic.

8. Just as renal tumours are usually associated with some evidence or history of hæmaturia, calculus, albuminuria, nephritic colic, or some notable change in the quantity or state of the urine, so ovarian tumours are usually associated with some change in the quantity and regularity of the discharge, or with suffering at the catamenial periods, and with some alteration in the mobility or situation of the uterus. But as in some rare cases of renal disease the urine may be normal, so in some rare cases of ovarian disease there may be nothing abnormal to be discovered in any of the pelvic viscera, nor in their functions.

By bearing these facts in mind an accurate diagnosis may be made in a very large proportion of cases. Some rare cases of exceptional difficulty may, however, be occasionally expected.

Not as any excuse for the careless or ignorant, but as some solace to others who have erred unwittingly, and as an answer to some who, having little experience of the difficulties of actual practice, are apt to speak of all mistakes as inexcusable, I quote the following remark of one of the greatest clinical teachers of any age or country—Bright: 'I have known the enlarged kidney to be mistaken for disease of the spleen—of the ovary—of the uterus—and for a tumour developed in the concave part of the liver; *nor is it, perhaps, possible, by the greatest care and the most precise knowledge*, altogether to avoid such errors.'

DISTENDED BLADDER.

Before dismissing the subject of renal cysts, a word of caution may not be superfluous, reminding the young practitioner that the bladder, distended with urine, has, in several recorded instances, formed an abdominal tumour, which has been mistaken either for an ovarian cyst, or for ascites, and has been tapped, in some cases with a fatal result. I was once accidentally present in an hospital when a woman was about to be tapped. The peculiar projection immediately above the pubes at once struck me, and I suggested that the catheter should be introduced. Five pints of urine passed through the catheter, and the tumour disappeared. In this case the patient was supposed to be suffering from incontinence of urine from pressure of the imaginary cyst, the urine which dribbled away being simply overflow from the paralysed bladder. As in any case the use of the catheter will set every doubt at rest, it is useless to say more than that distension of the bladder is of common occurrence both in uterine and ovarian tumours which are fixed in the pelvis. In some cases it is only by the use of a small and long elastic catheter that the bladder can be reached and emptied. This is especially necessary in cases of uterine tumour, where it is not rare to find the bladder drawn up nearly to the level of the umbilicus.

FÆCAL ACCUMULATIONS.

In his 'Clinical Lectures on the Diseases of Women,' Dr. Simpson says that there had been 'in the hospital a patient who was sent from the country, and presented on

admission the colour and appearance of a person labouring under some malignant disease. The facial expression might have led you to believe that she was the subject of a cancerous diathesis. She had a tumour in the left hypogastric region, about the size of a fist. But under the use of croton oil it readily disappeared, and proved to be only a mass of fæces in the colon. You might suppose that it would be difficult to mistake such a tumour for any kind of morbid growth, and you might imagine that the patient would be suffering from such a degree of constipation as at once to indicate its real nature. But there is not of necessity any degree of constipation present. On the contrary, there is sometimes diarrhœa. Dr. Abercrombie told me he once attended, with some other physicians, a case where there were large swellings felt in the abdomen, and the patient suffered severely from diarrhœa. After death the swellings were found to be formed merely by hardened deposits of fæcal matter in the sacculi of the large intestine, the central tract through the bowel being left free; and that he was then in attendance upon a patient suffering from obstinate diarrhœa, who at the same time had large scybalous masses accumulated in the colon. And you can readily understand how large collections of hard fæcal matter lying long in any part of the large intestine should at length give rise to such an amount of irritation there as to produce an attack of diarrhœa; and when this has become established, the original cause of it will readily be overlooked. The peculiar feeling of such a tumour will generally enable you to decide as to its true character: it feels like no tumour that I know of. On being examined either through the abdominal walls or through the rectum, it is felt to be hard and resistant; but if one finger be pressed steadily upon it for one or two minutes, it will at last indent like a hard snowball, and, as there is not the slightest elasticity about it, the indentation remains after the pressure is removed. If any doubt should still remain, the persevering use of aperients will clear up for you the diagnosis by causing the mass to be dissolved and carried off.'

Although I have several times seen lumps in the region of the cæcum and different parts of the ascending colon, which were clearly fæcal accumulations, yielding to the pressure of

the finger, and, owing to their containing or being surrounded with gas, having a certain degree of resonance on percussion, yet I have only once met with one of such a size as to be mistaken for an ovarian tumour.

This was a very remarkable case, which I saw with Dr. Waters, of Chester. I was summoned by telegraph to Chester, and on arriving there found for the first time, owing to a postal delay, that it was one of obstructed intestine. Stercoraceous vomiting had been going on for many days, and the lady was almost moribund. The abdomen was distended beyond the ordinary size at the full time of pregnancy, and apparently by a well-defined solid tumour, which I should have imagined to be uterine or ovarian but that it was semi-resonant on percussion.

Consulting with Dr. Waters as to the performance of Amussat's or Nélaton's operation, I thought it better rather to commence by an exploratory incision as in ovariotomy, in order to ascertain what the abdominal tumour really was. On dividing the peritoneum the tumour at first sight appeared exactly like a very large uterus, but on passing my hand under its lower border I found the uterus and both ovaries healthy. On percussing the tumour there was sufficient resonance to show that it was either intestinal or a cyst containing some air, and further examination convinced me that it was the cæcum and colon enormously distended. I accordingly performed a modified Nélaton's operation, first stitching the peritoneal coat of the cæcum to the peritoneal edges of the incision in the abdominal wall and then opening the gut. More than two pailfuls of semi-solid fæcal matter escaped, and the gut rapidly contracted as it became empty. I could not ascertain what the cause of the obstruction had been. The patient perfectly recovered, and some months afterwards I closed the artificial anus, after paring the edges, by stitching.

PELVIC CELLULITIS AND ABSCESS.

Since the subject of pelvic cellulitis has been studied, and the effects of the effusion of serum and of lymph in the loose cellular tissue of the broad ligaments and neighbourhood of the uterus, followed by the formation of pus and its discharge either spontaneously or by surgical assistance, have become generally understood, it is not often that ovarian tumours, even

when they are confined below the brim of the pelvis, are mistaken for pelvic cellulitis or abscess. But it is very probable that many of the recorded cases of supposed cures of ovarian or uterine tumours were merely instances of inflammatory exudations into some part of the pelvic cellular tissue, which were either removed by absorption or terminated in suppuration and the discharge of the pus, either by the rectum, vagina, bladder, or skin. In 1871 I saw a lady who had been supposed to suffer from ovarian disease, in whom a pelvic abscess discharged not only through the rectum, the bladder, the vagina, and in one loin, but gravitating down the leg, opened in the calf. A suppurating ovarian cyst might possibly end in the same way, but the history of the case, the severe pain, the high temperature at the onset of the disease before any considerable tumour had formed, the remarkable almost bonelike hardness and fixity of the swelling, as if inseparably connected with one or other ilium, and the flexure of the thigh from the way in which the psoas muscle is involved, are sufficiently characteristic. It is very seldom that an ovarian cyst shows any tendency to point in the situation where there is the greatest tendency to point in pelvic abscess, that is in the roof of the vagina, very near the cervix uteri, either behind or in front or to one side of it. An ovarian cyst or a pelvic abscess which had burst into the peritoneal cavity would be necessarily attended by the same symptoms as perforating peritonitis. But in one case the previous history would have been that of pelvic cellulitis, in the other that of an ovarian cyst which had become inflamed. It is seldom that a pelvic abscess extends upwards above the umbilical level. Hardness may be felt in one or other iliac region or above the pubes, and a corresponding hardness or swelling may be felt by the vagina, behind or in front or to one side of the uterus; and, if pus have formed, fluctuation may be detected. An ovarian cyst is not so firmly fixed in the pelvis; even if adherent there it does not give the same impression of close attachment to the pelvic bones. It rarely leads to such troublesome dysuria, to such rectal pain or tenesmus, to such constant throbbing, or to such enforced quiescence of the lower limbs; and the general outline of an ovarian cyst can be more easily traced than the diffuse bulging of a pelvic abscess. The swelling in pelvic abscess is harder,

more painful on pressure, and accompanied with nervous pains such as are usually called sciatica or pelvic neuralgia. It is not often that an ovarian cyst suppurates until it has existed for some time, or has attained a large size; but the whole course of a pelvic abscess, from its commencement till the discharge of pus is effected, is seldom more than from three to four weeks.

HÆMATOCELE.

As in pelvic cellulitis, so in hæmatocele, it is only a small ovarian tumour which has not risen out of the pelvis, or a large ovarian cyst which has suppurated, that could be mistaken for either the early and small or the later and large stages of pelvic cellulitis or hæmatocele. A small hæmatocele in the early stage produces much the same local conditions, is accompanied by very similar pain, and almost as much general fever as pelvic cellulitis, and is apt to be associated with about the same amount of pelvic peritonitis. Indeed, it is very probable that many of the cases of pelvic cellulitis take their origin from a hæmatocele. Some blood escapes into the loose cellular tissue in the neighbourhood of the uterus about the time of menstruation; a clot forms, does little harm by itself, but pelvic cellulitis is set up, which becomes the more grave condition, and ends in abscess, the clot which excited it disappearing. It is only when the effusion of blood is large and sudden, its escape through the Fallopian tube prevented, and its general diffusion in the peritoneal cavity limited by peritonitis and adhesions, that a distinct pelvic or abdominal tumour is formed. It is only rarely that such a tumour extends as high up as the umbilical level; much more frequently it is either within the pelvis, behind or to one or other side of the uterus, and barely to be felt through the abdominal wall. These characters are quite sufficient to distinguish it from a large ovarian cyst. Small ovarian cysts do not commence so suddenly, are not so closely associated with the catamenial period, nor is their advent ushered in by such acute pain or febrile disturbance. An ovarian cyst is seldom dangerous to the life of the patient before it has attained considerable size, whereas a hæmatocele of very moderate extent and of sudden formation may be either rapidly fatal or lead to very dangerous symptoms.

The following narrative may serve to illustrate the above remarks, and I have seen several similar cases. A young lady was travelling from Paris to London. Before she reached Calais the menstrual discharge commenced. Between Calais and Dover she was wet, cold, and sea-sick. Before she reached London the discharge, which had begun freely, stopped entirely; she was in severe pain, and feeling extremely ill. Dr. Priestley was consulted next day, and found considerable swelling in the right iliac region, with extreme tenderness on pressure. A high degree of fever and restlessness, with increase of the local swelling, and an absence of menstrual discharge, were the principal symptoms for the few succeeding days. Then some reappearance of uterine hæmorrhage was accompanied by temporary relief; but this was followed by an increase of swelling, and by the fever assuming the hectic form. Dr. West, Sir J. Paget, and Dr. De Mussy were all consulted, and when I first saw the patient her sufferings were so excessive that the examination could only be made when she was under the influence of chloroform. The abdominal swelling was principally confined to the right side, and extended nearly as high as the false ribs. The uterus was fixed, pushed forwards and to the left, and there was distinct pointing in the vagina behind and to the right of the uterus. The possibility of the existence of an ovarian cyst which had rapidly enlarged and become acutely inflamed was carefully considered, but the history of the case indicated so clearly hæmatocele followed by pelvic abscess, which was pointing towards the vagina, that puncture by the vagina was strongly urged, and was only deferred owing to the absence of a member of the family, and in the hope that as the abscess was distinctly pointing it would open spontaneously. A few hours after this consultation, sudden collapse and the well-known symptoms of perforating peritonitis set in, followed by death the next day. In another case which I saw with Sir James Paget, a hæmatocele passed below Poupart's ligament, and I opened it in the thigh. It was completely cured by drainage. It had been taken for psoas abscess and spinal disease; but examination by the vagina easily led to a correct diagnosis.

As curiosities of surgical experience, but not arising sufficiently often to call for more than passing notice, and as morbid changes which may possibly be mistaken for ovarian

disease, may be enumerated encephaloid tumour of the ilium, enchondroma or osseous tumours projecting from the sacrum, angular curvature of the lumbar vertebræ, enlargement or malignant disease of the lumbar glands, or dissecting aneurism of the aorta. I know of one case where a tumour in the pelvis was punctured by the vagina; the patient died from bleeding before the surgeon left the room, and after death it was found that an aneurism of the aorta above the bifurcation had dissected downwards behind the peritoneum, and formed a considerable tumour in the hollow of the sacrum. I have seen three cases where encephaloid disease, arising in the cancellated bony tissue of the ilium, had not only projected backwards and towards the buttock, but so far inwards and upwards as to form a considerable abdominal tumour. In one of these cases the abdominal tumour transmitted a distinct pulsation from the aorta; in another the growth itself was pulsatile; in the third the rectum was completely occluded by the growth. The other states above enumerated scarcely need further remark; a little attentive consideration of the history and progress of the cases will be sufficient to distinguish them from any form of ovarian disease.

Some remarks on the diagnosis of extra-uterine pregnancy may be found at pages 122–23.

The woodcut which follows may serve to illustrate a com-

bination of retroverted gravid uterus with distended bladder, which might possibly become the cause of an error in diagnosis

CHAPTER III

THE MEDICAL TREATMENT OF OVARIAN TUMOURS

I DO not say that medical treatment is of very little use in cases of ovarian tumour, simply because I am a surgeon and can remove the disease. But on looking over the medical literature of the subject, one finds the keynote of this chapter always the same—hopeless impotence.

The sum of medical doctrine on the subject amounts to this: palliate where you can; do no mischief where you cannot. The general state of health of the patient is obviously the first consideration; every attention is to be paid to it. All matters of diet, hygiene, tonics for the body, and consolation for the mind are to be regulated and administered under the conviction that whatever tends to support the strength and cheer the spirits of the patient does as much as can be done in arresting the progress of a disease which, in its essentially parasitic character, flourishes under despondency and preys upon weakness. Though all these cases are not utterly hopeless, and some few may spontaneously come to a standstill, yet when steady progress can be observed from time to time, it is better at once to disabuse the mind of vain expectations, to seek temporary relief of urgent symptoms by rational expedients, and either to encourage a buoyant anticipation of ultimate rescue by operation, or to lead the patient by degrees towards confiding resignation to the inevitable.

The local miseries which we have to alleviate mostly arise from pressure or congestion. The due action of the bowels and bladder is interfered with, the veins are pressed upon, and œdematous swelling of the extremities shows itself, the area of the chest is encroached upon and breathing is made difficult, a teasing cough supervenes, or the heart is embarrassed and the brain action enfeebled. Common sense will suggest

the fitting choice of sedatives or stimulants, aperients or enemas, the use of the catheter, changes of position, the application of bandages or mechanical supports, and the possibility of relief sometimes to be obtained by manually shifting the position of the tumour when it is low down or impacted in the pelvis.

Although many writers have insisted on the supposed fact that vascular excitement and congestion aggravate every symptom, and accordingly enforce the utmost possible precaution against sexual excitement and marital intercourse, I have never actually seen more than would lead one to advise that conception is a possibility which must always be borne in mind. It is true that oftentimes the pregnancy proceeds to its end, and labour is accomplished without much more than ordinary difficulty; yet the complication is a cause of just anxiety, and may even give rise to a state of things which renders the question between palliative measures and removal no longer one of choice, and places the patient under the obvious disadvantages of an operation more than otherwise serious.

But, independently of the troubles incident to the ordinary course of the disease, accidents will happen. The patient may get some local injury from a blow or a fall, or she may be chilled, and, as usual, the weakest part suffers. Inflammation is set up in the tumour or in the peritoneal covering, and judicious treatment is called for. Absolute rest, fomentations or poultices, and opium, with or without mercury, must be used so as to avoid, if it can any way be averted, the complication of pus formation or plastic adhesions.

The verdict of Boinet against the value of oxide of gold in the treatment of ovarian cysts will apply with equal truth to the proposals made in this country to cure ovarian cysts by chlorate of potash. Either no good has been done, or, where real benefit has followed the use of the remedy, no doubt there had been a mistake in diagnosis. So with the supposed value of drastic purgatives and hydragogues; if used when the dropsy is really ovarian they have often done harm, rarely good. When they have done good, fluid has been free in the peritoneal cavity or discharged into it. Some years ago I met with a curious illustration of this statement. I was asked to see a young lady in consultation with Dr. Headlam Greenhow, who

had ascertained that she was the subject of a large single ovarian cyst, and had recommended tapping, as the distension was rapidly becoming greater and more distressing. The late Dr. Marsden had also seen the patient. He believed the disease to be ascites, said that tapping was unnecessary, and that he could cure the patient by calomel and elaterium. After a careful examination of the patient, I satisfied myself that Dr. Greenhow's diagnosis was correct. The fluid was distinctly confined in front of the intestines by a cyst, and there were none of the variations of sound on percussion after alterations in the position of the patient, which are so characteristic in ascites. Indeed, the case would have been a typical one for teaching to a class the physical signs of a large single cyst. I quite agreed with Dr. Greenhow that tapping was clearly indicated, and that drastic purgatives could only be useful if the cyst should burst. As increase in size had been very rapid, and the cyst was evidently thin, I thought spontaneous rupture would very likely take place if tapping were not soon resorted to, and that rupture would be still more likely if violent purgatives were given. The danger of tapping seemed to me to be very much less than the danger either of spontaneous rupture, or of rupture accelerated by purging. This was fully explained to the friends, but they chose to submit the patient to the medical rather than to the surgical treatment It is only fair to the memory of Dr. Marsden to say that his treatment was followed by complete success. The patient was dangerously ill for a time, and I have no doubt whatever that a thin cyst did give way, its contents escaped into the peritoneal cavity, were absorbed, and were carried off by the watery motions excited by the calomel and elaterium. For one such rare success as this I feel sure, however, that a repetition of similar treatment would be followed by many failures, by much useless suffering, and by great danger. I only record the case here as a warning to those who would unhesitatingly condemn such attempts as necessarily and invariably useless, and to show the necessity of explaining the possibility of their occasional success under rare and exceptional conditions.

Whenever an ovarian cyst or tumour has attained so large a size that the comfort and general health of the patient are seriously interfered with, it may be taken as certain that

ordinary medical or palliative treatment will be of little avail. Any specific medical treatment by iodine, or bromine, or mercury, or gold, or arsenic, or lime, or potash, used with the hope of modifying the nutrition or checking the growth of such tumours, must be as useless as any diuretics or other medicines expected to lead to absorption of the contents of the cyst; and it would be well if the rule were adopted to prohibit any medical treatment which could possibly injure the general health of the patient, or place her in a less favourable condition than she otherwise would be for such surgical treatment as may ultimately be called for.

The question when surgical aid really is required, or how long a patient should be left to ordinary medical care, undisturbed by any surgical treatment, is one which is daily occurring in practice, and the answer should be framed upon some such common-sense rules as the following: so long as the patient does not suffer much pain, is not annoyed by her size and appearance, has no great difficulty in locomotion, does not suffer from injurious pressure on the organs of the chest, abdomen, or pelvis; and so long as the heart and lungs, digestive organs, kidneys, bladder, and rectum perform their functions tolerably well, the idea of a surgical operation should seldom be entertained. And if we look only at the urgency of the present circumstances, nothing need be done. Life is not immediately threatened, and by watching the advancing symptoms the moment for action can almost always be determined. But with the experience of the nine years which have elapsed since the publication of my edition of 1872, I have become more and more disposed to advise the removal of an ovarian tumour as soon as its nature and connections can be clearly ascertained, and it is beginning in any way physically or mentally to do harm, since the risk of the operation under such circumstances is certainly less, and the possible evils of delay are eluded. Where, however, while the development continues, the symptoms follow their usual course, and the distress of the patient forces her to demand some kind of relief, there is either reluctance or refusal to face the liabilities of excision, or family considerations impose the necessity of delay, the size, nature, and connections of the tumour must guide us in the selection of one or other of the minor methods of palliative surgical treatment,

which, though they seldom lead to a cure, have the advantage of enabling us to alleviate the most distressing symptoms, and to wait for an opportunity to try some of the greater expedients which have been from time to time adopted for the obliteration of these cysts, or to carry out the last resource of ovariotomy.

These palliative measures, or what may be called minor methods or substitutes for ovariotomy, may be thus enumerated:—

1. Simple tapping through the abdominal walls.
2. Simple tapping through the vagina.
3. Simple tapping through the rectum.
4. Tapping followed by pressure.
5. Tapping and the formation of a permanent intra-peritoneal opening in the cyst wall.
6. Tapping and drainage, or the formation of a permanent opening through the abdominal wall, the vagina, or the rectum.
7. Incision.
8. Tapping followed by injection of iodine.

CHAPTER IV

ON THE PALLIATIVE AND MINOR SURGICAL TREATMENT OF OVARIAN TUMOURS

TAPPING.

As experience has increased and the mortality after ovariotomy has diminished, professional opinion has been unsettled as to the use or propriety of tapping ovarian cysts. Some writers have gone so far as to assert that it is an operation which ought to be completely abandoned. Stilling, for example, in his work on the 'Extra-Peritoneal Method of Ovariotomy,' says, p. 161, that '*No surgeon should ever puncture an ovarian cyst. Tapping is a crime.*' He adds, '*Never tap.* Ovariotomy becomes more difficult the oftener a patient has been tapped before it, and the patient is made worse by every tapping.'

Few surgeons here would assent to this, but there are many who object to tapping on two grounds—first, that it is dangerous in itself, and can only be of temporary utility; and secondly, that it is likely to be followed by adhesions or other conditions which add greatly to the danger of subsequent ovariotomy.

In considering the objection to tapping on the ground of its danger, as compared with the danger of ovariotomy, some writers appear to me to have fallen into a great error. They take a certain number of cases of ovarian disease, and say that so many patients died after one tapping, so many after five, six, or ten, and conclude that tapping is a very fatal operation. I have heard it gravely asserted that it is a more fatal operation than ovariotomy, because after ovariotomy, nine tenths of the patients recover, while after tapping, sooner or later, they all die. But the very important distinction is overlooked between an operation which either cures or kills, and one which

only fails to save life, or kills only under most exceptional circumstances.

It is seldom that a surgeon is called upon to perform ovariotomy in order to save a patient from imminent death. But this does occasionally happen. Dr. Wiltshire and Dr. Watson have published a case where a woman, who was dying from bleeding into an ovarian cyst, was saved by immediate ovariotomy. I have been sent for twice to operate under similar circumstances, but both patients were dead before I arrived. In both large veins had burst, and some pounds of blood were found inside ovarian cysts. If, in any of these cases, the death of the patient had followed ovariotomy, it could hardly be said that this operation had killed the patient; it had only failed to save life. So, if a patient be near death, poisoned by an ovarian tumour in a state of gangrene from twist in the pedicle, or by the fetid contents of a suppurating cyst, ovariotomy, if performed unsuccessfully, can only be said to fail in saving life—it cannot be said to kill. Yet I have operated successfully under such desperate circumstances; and several times when rupture of a cyst into the peritoneal cavity had been followed by diffuse peritonitis. In any such case, ovariotomy must be identified with trephining, tracheotomy, herniotomy, or the ligature of some large artery in a case of wound or burst aneurism, or primary amputation of a limb in compound fracture. It is not the operation which is the cause of death, but the disease or accident from the effects of which the patient is not saved by the operation.

But such cases as those just alluded to must be very rare exceptions to the large majority in which ovariotomy becomes the subject of consultation. There is generally as much time for discussion as in the parallel case of lithotomy in the male adult. And in both cases the responsibility of operating with the full knowledge that, if the patient be not saved by the operation, he or she is killed by it, must be fairly faced. It is true that death would almost always be caused by the stone or the ovarian tumour, but it might be at a distant period, and if death follow the operation in a few days the operation must then be regarded as its immediate cause.

Tapping stands on a totally different ground. As a rule, when a patient dies after tapping, it is not that tapping has

hastened her death, but simply has not succeeded in saving her life. Her life may have been prolonged by repeated tappings, but at last she dies worn out by the disease.

Tapping may be practised—first, through the abdominal wall; secondly, through the vagina; and, thirdly, through the rectum. Whichever of these methods may be selected, it may be trusted to alone, or it may be followed by pressure, or by drainage, or by the formation of a permanent opening, either in the cyst wall only, with the object of establishing a constant communication with the peritoneal cavity, or through the abdominal wall, vagina, or rectum. In the one case the fluid passes into the peritoneal cavity and is absorbed, no external opening being left; in the other a fistulous external opening is kept up until the cyst ceases to pour out fluid and becomes obliterated. In any of these cases the processes may be assisted by pressure; and in some tapping may be followed by the injection of iodine.

TAPPING THROUGH THE ABDOMINAL WALL

was formerly practised with the patient sitting in a chair, a pail between her legs, an assistant on either side of her, keeping a sheet, or long towels, so tightened round the abdomen by pulling at the ends, that the escape of the fluid was supposed to be assisted, and the fainting of the patient prevented. A hole in the sheet, or a space between two towels, left room for the passage of the trocar. The operator, standing in front of the patient, used the trocar like a dagger, stabbing with considerable force. A good deal of discussion arose at one time as to the propriety of dividing the skin and fascia with a lancet before using the trocar. Some thought it unnecessarily prolonged the operation, others thought it spared the patient the shock and pain of a forcible stab. Any way the operation was a very distressing one. The fainting of the patient was by no means uncommon; she suffered from exposure and shock, her clothing was often wetted by the fluid, and she was taken back to bed frightened, wet, cold, faint, and exhausted. No doubt some of the dangers of tapping depended upon the clumsy method of proceeding. It is difficult to understand otherwise that the mortality after tapping could possibly have been as

high as many writers have estimated it. Simpson's calculation was that the mortality after first tappings was not less than one in six. Under the present simplified mode of tapping, I very much doubt if it is as much as one in sixty. I believe it is considerably less than this in my own experience. I have removed 115 pints of fluid from a patient at one tapping, and 121 from another, without the slightest sign of faintness, without wetting either the linen of the patient or the bed clothes, and without disturbing her position in the bed. I have often had occasion to remove 30, 40, or 50 pints of fluid from patients as they lay on the side in bed, and they are only conscious of the relief afforded by the removal of pressure. It is quite unnecessary to take the patient out of bed; if she has been moving about she should go to bed, and should lie on one side near the edge of the bed, so that the abdomen projects over the edge. As a rule, the linea alba is the preferable site for puncture, but any hard portions of the tumour should be avoided, and the most elastic or distinctly fluctuating points of the tumour selected. Before puncturing, great care should be taken by palpation and percussion to ascertain that no intestine is lying, or adhering, between the cyst and the abdominal wall, at the point selected for tapping; and any visible superficial veins should be avoided. It is certainly advantageous to puncture the skin with a lancet before using the trocar, and if the patient is very sensitive to pain the seat of puncture may be frozen by ether spray. And every now and then with a very nervous subject, or where the excessive accumulation of fat on the abdomen gives a formidable look to the proceedings, and may perhaps occasion some little difficulty in driving the canula to its destination, it may be as well to administer a slight amount of some anæsthetic so as to calm the timidity, or give the operator the opportunity of doing what he has to do with greater facility.

The condition of the cyst wall may also be the cause of embarrassment or danger in tapping. I have many times observed it so far gone in degenerative changes as to make it absolutely friable; and though it has been kept entire by the equable support of the surrounding parts, any essays to puncture with a trocar must have crushed it and caused the discharge of the contents. In at least three operations where I came upon

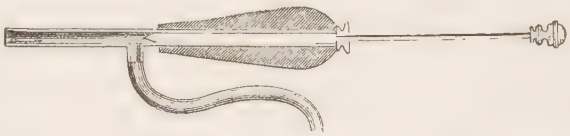
fluid free in the peritoneum, on examining the cyst, the hole made in a previous tapping was quite open, a piece of inelastic matter having been forced away so that there was no possibility of closing There have been, too, some examples among my cysts of bony deposit in the tissue sufficiently hard to turn the point of a trocar if it happen to impinge upon the spot, and Dr. Ritchie reports of one of my tumours, No. 96, a partial thickness of two inches, enough to arrest any ordinary operator under the impression that he had come into contact with a solid fibroid. In other multilocular cysts one compartment may have walls of almost impenetrable solidity, and an adjoining one of not more than a line in thickness, so that a first attempt to draw off fluid may be an utter failure and lead to an erroneous conclusion, while the next, from shifting of the position of the mass or change of point of puncture, may fall upon a thin loculus, give vent to the contents, and alter the diagnosis completely.

The trocar has been greatly improved of late years. The old instrument was so short that, if the abdominal wall was thick, the trocar never reached the cyst, or it may just have punctured the cyst, and the canula was too short to follow it. In the first case no good, but no harm, was done; in the second the results were dangerous or fatal. The punctured cyst poured out its contents into the peritoneal cavity, and dangerous symptoms or death followed, the danger arising not necessarily from the tapping, but from the bad way in which it was done.

Great difference of opinion has been expressed as to the danger or harmlessness of admitting air into an ovarian cyst while the fluid is escaping. Some writers have argued that it can do no harm. My own opinion, founded upon the few cases where I have been quite sure that air has entered, is very decidedly in accordance with those who assert it to be frequently followed by cyst inflammation, and by the fever which accompanies it, and by decomposition of the fluid which remains in the cyst, or is secreted soon after the tapping. I therefore regard the improvement in the trocar which provides against the entrance of air into the cyst during the escape of fluid, as an important element in the diminution of the mortality after tapping. We are indebted to Mr. Charles Thompson, of Westerham, for introducing the simplest and most effectual instrument by which this object has been attained. This was described in the

'Medical Times and Gazette,' March 27, 1858, as a 'new trocar for paracentesis thoracis.' In his own words, 'it consists of a cylindrical silver canula about four inches long, into which opens at near its middle a short silver conducting tube of the same calibre, to which a piece of india-rubber tubing about a foot long is attached by a screw. In this canula plays a solid steel

piston, with a trocar point, its body being of such length that, when fully pushed forward, as in the above figure, its point protrudes sufficiently from the canula, and its other extremity seals the entrance of the conducting tube; and, when fully withdrawn, as in this figure—



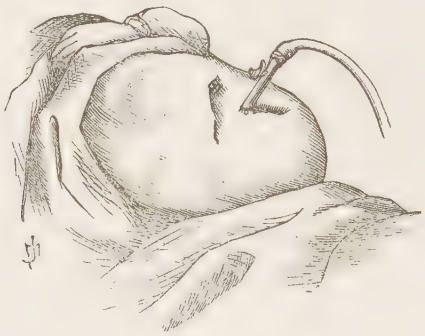
it retires so far as to open the conducting tube. This piston must fit the canula so perfectly as to be air-tight when greased. The little cap of the canula unscrews to admit of the removal of the piston for greasing or cleaning. The outer half of the canula is mounted in a solid wooden handle to give a firm grasp of the instrument.

'The mode of using it is as follows: Having well greased the piston, draw it back, as in the second figure, and, placing the end of the elastic tube into a basin of water, withdraw the air from it by suction at the end of the canula, and when the water reaches the lips push forward the piston. The elastic tube is now filled with water, which cannot escape, and the instrument is ready for use. When it is plunged into the chest, pull back the piston so as to open the conducting tube. When the fluid follows, and directly it meets the water in the tube, a syphon is formed. The end of the tube should be kept under fluid during the operation. If it is required to stop the flow either during a fit of coughing or to change the receiving vessel, it can be done instantaneously by just advancing the piston sufficiently to cover the conducting tube.'

As soon as I read this description of the new trocar, I saw how useful it would be, both in tapping ovarian cysts and in ovariotomy, and I had instruments made with canulas of different lengths and calibre, suitable for both purposes, and continued to use them for some months, and found that great advantages were gained by the use of the instrument. Admission of air was prevented, the syphon action assisted in keeping up a continuous flow of fluid, while the escape could be stopped at any desirable moment. If the tube or canula became blocked it was easily cleared. The fluid was conveyed into the receiving vessel, while the patient was kept perfectly dry, not alarmed by the splashing of the fluid, and not disturbed by the changing of the basins, which was so troublesome when the old instrument was used. To some a practical improvement of this kind may appear of small value, but any one who does much real work at the bedside will, I think, agree with me in the opinion that Mr. Thompson, by this simple and ingenious contrivance, has proved himself to be worthy of his hereditary position, and of the estimation in which his family have been held for generations in the county of Kent.

While still desirous to carry on the principle of the syphon, as adapted to the trocar, I became anxious to avoid the momentary delay, between the introduction of the trocar and the escape of the fluid, while the piston was being withdrawn. I was led to this by observing that, when using the large-sized instrument in ovariotomy, there was sometimes a rush of fluid between the cyst and the outside of the canula before the piston could be withdrawn, and it was evident that the same thing might occur during ordinary tapping. I was therefore anxious to make the piston hollow, but, after two or three trials, it occurred to me that something like a steel pen sliding in the pencil-cases in ordinary use might be a more convenient mode of effecting the object in view. I first carried out this idea in an instrument of the size for ovariotomy, adding, to the ontside of the canula, grooves upon which the cyst could be tied as it became lax. This instrument was described in a paper read before the Royal Medical and Chirurgical Society. Modifications which I have since made in this instrument will be described in the chapter on Ovariotomy. When the instrument is made of the size for simple tapping, the canula is

perfectly smooth. A lancet puncture is made through the skin, and the instrument is then easily thrust into the cyst. Fluid escapes immediately, and the point is at once withdrawn to prevent injury to the cyst as it contracts. It is important that the edges of the canula should not be thin, but perfectly smooth and well rounded off. There would otherwise be danger of injury to large veins on the inner surface of the cyst; and the maker should be careful, in sharpening the cutting end of the hollow trocar, to leave one half of the lips quite blunt. If sharpened all round it would act as a punch, and cut a circular hole in the skin. I have seen a tube blocked in this way, and I have more than once seen a round piece of skin floating in the fluid, or so nearly detached after



the canula was withdrawn that it was better to cut it away. If the instrument is properly finished, only a semilunar cut is made in the skin and cyst, which closes much more readily than the triangular puncture made by the old trocar.

Instead of the india-rubber tube, it is quite easy to fix to the end of the canula an ordinary india-rubber enema syringe, by which more powerful exhausting suction can be brought to bear upon the contents of the cyst than can be obtained by the syphon tube; and if it be desirable to wash out the cyst, or to inject iodine or any other antiseptic into it, this can be readily done by reversing the syringe without removing the canula.

When using this syphon trocar it is not necessary to fill the tube with water, as Mr. Thompson directs, if care be taken so to introduce the instrument that the point passes into the fluid at a lower level than the commencement of the tube,

as shown in the sketch on the previous page. Air will not descend except under strong suction, or into a vacuum, and there is no fear of air passing up the tube and down the canula into the cyst. The instant the canula enters the cyst, fluid rushes into it, pressing the air before it, and if the tube be properly mounted so that it does not bend or narrow the canal, the tube, which should be about three feet long, at once becomes the long arm of a syphon. The suction power of this long column of fluid is so great that the air can be heard to be drawn bubbling into the tube, even through the well-fitting bayonet joint provided for the withdrawal of the point of the instrument. It is better to keep the end of the tube under the fluid when the cyst is nearly empty, to avoid any accidental drawing inwards of air as a patient makes some deep inspiration or expiration, leading to a kind of vacuum within the abdomen; and in withdrawing the instrument it is always well to press the abdominal wall close down upon the cyst, and with the finger and thumb of the other hand so to hold the abdominal walls together behind the escaping canula as to prevent any entrance of air.

Instead of the syphon-trocar some surgeons have used aspirators of different sizes and modifications. But they are all open to the objection that, as the cyst becomes empty its flaccid walls are sucked into the end of the canula and stop the flow of fluid.

Should any bleeding follow the removal of the instrument and not be stopped by a little pressure, a harelip pin may be passed completely across the opening, deeply enough beneath the skin to compress any injured vessel. Two or three turns of silk twisted round the pin make sufficient pressure to stop any bleeding. It will not do simply to bring the edges of the skin together with a pin; this might only conceal dangerous internal bleeding. In some cases internal hæmorrhage, even fatal, has followed the puncture, and this may be explained either by the opening of varicose vessels in the cyst wall, where they sometimes attain enormous development, or by the presence of such enlarged veins in the omentum as were found in the examination of the woman operated on as my 731st case, where the size was such as to have made the suppression of bleeding impossible without immediate gastrotomy. One of my neighbours lost a case within

a few hours after tapping; upwards of five pints of blood, which had escaped from a varicose vein, having been found in the peritoneal cavity. The vein ran directly in front of the peritoneum, immediately beneath the linea alba, from the umbilicus towards the liver. A pin through the whole thickness of the abdominal wall would have compressed this vessel.

Whenever it is doubtful if a cyst has been completely emptied, or there is some escape of fluid after the removal of the trocar, the comfort of the patient is greatly increased by closing the opening with a harelip pin and twisted suture, but the pin need not be passed so deeply as in case of bleeding. I was led to adopt this practice from the remark made to me by Mr. Cæsar Hawkins upon a case where oozing after tapping was going on. He said, 'When they ooze they always die,' so I determined that they should not ooze unless I wished to drain. In ordinary cases a pin is not necessary, a small pad of lint and a strip of adhesive plaster being quite sufficient to cover the opening, and the abdomen should be supported by an ordinary binder.

In order to prove that simple tapping through the abdominal wall is occasionally followed by a radical cure, the following cases are important :—

In July 1863 an unmarried domestic servant, 30 years of age, came from Liverpool to the Samaritan Hospital. The abdomen was so distended by a unilocular cyst that the ensiform cartilage was pushed forwards. I decided to tap this cyst, and if I found the contents were limpid to do no more, but, if viscid fluid escaped or secondary cysts were found, to perform ovariotomy at once. She was only tapped, and soon after returned to Liverpool able to take another situation, and was very well for about three years after the tapping. The lady who sent her afterwards wrote to me 'that she had died in Manchester, I cannot remember from what complaint, but nothing connected with the disease.'

In April 1865 an unmarried lady, 20 years of age, was sent to me by Dr. Miller, of Southsea. The whole abdomen was distended by a single cyst, which had been forming for about eighteen months. The lungs were beginning to suffer from pressure, and I advised immediate tapping, stating that the case might prove to be one of the exceptional instances in

which tapping not only relieves but cures. I removed fourteen pints of limpid fluid with a slightly greenish tint. About four ounces were preserved in a bottle for examination. On removing the stopper bubbles of carbonic acid arose as from Seltzer water. The reaction was strongly alkaline. On boiling a small quantity in a test tube, no change was perceptible until after the addition of nitric acid, when an abundant white precipitate appeared, and brisk effervescence took place. The precipitate assumed a faint greenish tint, and the supernatant fluid was absolutely colourless. Nothing could be discovered in it by microscopic examination. Probably the chief alkali present was carbonate of soda, for when the fluid was added to spirit it burned with a very yellow flame. The patient returned to the country nine days after the tapping, and remained well for about six months. Then Dr. Miller informed me that, upon the termination of one of her menstrual periods, symptoms of peritonitis showed themselves, but yielded in about twenty hours to calomel and opium. With this exception she has remained perfectly well, and without any sign of refilling of the cyst, since the tapping. I heard of her in 1872 as quite well.

In July 1865 I saw an unmarried lady, 29 years of age, with Mr. Fox, of Weymouth; made the diagnosis of a non-adherent single cyst, advised one tapping, and removed thirty-two pints of fluid, as clear as distilled water, on July 20, 1865. Immediate relief followed the tapping, and in February 1866 Mr. Fox told me that there had been no refilling, and that she had remained remarkably well and active. The history of this case, both before and after the tapping, is curious. In June 1860, although she was very large, she was dancing, gave a sudden scream, became faint, and collapsed. Mr. Fox gave stimulants freely. Next day she began to pass enormous quantities of fluid from the urethra, estimated at from thirty-five to forty-five pints in three to four days, until the abdomen became quite flat; and Mr. Fox related the case in the 'British Medical Journal,' as a case of spontaneous cure of ovarian cyst. But in October 1863 she began to enlarge again, and continued to increase until I tapped her in July 1865. After this tapping she remained well till the end of 1866; then she began to refill, and during the summer of 1867, whilst getting

into an omnibus at Portsmouth, she fell and struck the abdomen violently. Soon afterwards profuse diuresis set in, and she was rapidly reduced in size, as before. In April 1869 Mr. Fox wrote : 'She continues quite well; there has been no tendency to refill since she fell at Portsmouth.' I heard of her in 1872 as continuing well.

In March 1865 I saw a widow, 42 years of age, with Dr. Greenhalgh, suffering from an ovarian cyst, which filled the abdomen, and could be felt low down in the pelvis pressing the uterus forwards and upwards. I emptied the cyst, by tapping, on March 25, 1865. The fluid was dark brown in colour and rather viscid. I fully expected that it would soon form again, but in August she wrote to say that 'there were no signs of the tumour filling, and Dr. Everet could not detect any fluid whatever.' In April 1869 she wrote: 'My health has very much improved. I have had no return of the disease. I am in better health than I have been for many years past. In 1867 I married again, and had the advantage of residing in a most healthy watering-place in the North of England, where in a few months I gained flesh and strength.' I have reason to believe that this patient remains quite well.

I have selected these cases as the earliest in my note-books, but I have had several other cases under observation for shorter periods, where single cysts, after having been emptied of limpid contents, have remained without any signs of refilling, and the patient has continued in good health. In one of the earliest cases, which was published many years ago by Mr. Cooke, I tapped the patient in the Samaritan Hospital only the day before she was married. She became pregnant at once, and has had several children since, without any sign of refilling of the cyst. Mr. Cooke supposed that the pressure of the increasing uterus had some share in preventing the cyst from refilling.

It will be seen by a perusal of these cases and by my subsequent experience that I am quite in accord with the conclusions drawn so recently by Dr. Méhu from his researches on the abundant material supplied to him by the hospitals and practitioners of Paris, that in spite of what may be said about Dr. Greenhalgh's exceptional case, it is only when single, and

probably broad ligament or extra-peritoneal cysts, are tapped, and clear, non-albuminous fluids are evacuated, there is a reasonable hope of fluid not again accumulating.

In order to weigh the value of the various objections to tapping, I have gone over the records of my first five hundred cases of ovariotomy, and have arranged in the following table the cases where tapping had never been practised, and where it had been performed from one to eighteen times:—

Cases	Number	Recoveries	Deaths	Mortality per cent.
Never tapped . .	235	180	55	23·4
Once tapped . .	140	107	33	23·57
Twice tapped . .	49	32	17	34·69
Three times tapped .	32	25	7	21·87
Four „ .	15	10	5	
Five „ .	3	2	1	
Six „ .	6	3	3	
Seven „ .	3	2	1	
Eight „ .	5	4	1	
Nine „ .	4	3	1	34·
Ten „ .	3	3	0	
Eleven „ .	1	0	1	
Fifteen „ .	1	1	0	
Sixteen „ .	2	1	1	
Eighteen „ .	1	0	1	
	500	373	127	25·4

Two hundred and sixty-five of these five hundred patients upon whom I have performed ovariotomy had been tapped previously, from one to eighteen times. One hundred and ninety-three of these tapped patients recovered, and seventy-two died, giving a mortality of 27·16 per cent.

It may be seen that the general mortality of the 500 cases is 25·4 per cent., and that 235 patients, or nearly one-half, had never been tapped. In them the mortality is 23·4 per cent., just 2 per cent. less than the general mortality. In other words, the mere fact that a patient has or has not been tapped (so far as can be judged from 500 cases in the hands of the same operator) does not affect the result of the operation by more than 2 per cent. Indeed the mortality of the patients not tapped, though less by about 10 per cent. than that of the patients who had been tapped twice, is greater than that of the patients who had been tapped once and three times. Thus 140—or rather more than one-fourth—had been

tapped once, and the mortality was 23·57 per cent. Of 32 who were tapped three times, the mortality was 21·87 per cent. Of the 49 who were tapped twice, the mortality was nearly the same as that of the group of cases tapped from 4 to 18 times, namely 34·69 per cent., or about 1 in 3.

I have not extended this calculation over the whole thousand cases, because from accidental circumstances the record of previous tappings has not latterly been so complete as to furnish very exact results; but an investigation of the details so far as they are clear leaves an impression that the aspect of the question remains unaltered.

It may be taken then as almost certain that the mortality of ovariotomy is but little affected by tapping—that the fact of a patient not having been tapped, or having been tapped very often, is by itself of little or no value in prognosis. I have stated elsewhere that such adhesions as are apt to follow tapping have no appreciable effect upon the mortality after ovariotomy; and I can now add that in some of the patients who have been tapped most frequently there were no adhesions, and there were firm adhesions in some who had never been tapped.

Although more impressed of late years by the danger of putrefactive changes in the fluid after tapping without antiseptic precautions, I still adhere to the following propositions:—

1. That in cases of simple ovarian or extra-ovarian cysts, it is right to try the effect of one tapping before advising a patient to undergo a more serious risk. But in compound or multilocular cysts the third proposition holds good.

2. That one or many tappings do not increase considerably the mortality of ovariotomy.

3. That tapping may sometimes be a useful prelude to ovariotomy, either as a means of gaining time for a patient's general health to recover, clearing the urine of the load of albumen with which it is sometimes charged under the mere influence of pressure, or of lessening shock, by relieving her of the fluid a few hours or days before removing the solid portion of an ovarian cyst; and

4. That when the syphon-trocar, which I brought before the profession in 1860, is carefully used in such a manner as to

prevent the escape of ovarian fluid into the peritoneal cavity, and the entrance of air or of putrefactive material into the cyst, the danger of tapping is extremely small.

TAPPING THROUGH THE VAGINA

is much more liable to be followed by inflammation of the cyst than tapping through the abdominal wall, because it is not easy to prevent the entrance of air. We should always endeavour to avoid this accident by attention to the level of the canula, but the attempt does not invariably succeed. The operation of tapping through the vagina is selected, not so much with the intention of simply emptying the cyst, as for the chance that, should the fluid escape by the opening as fast as it is secreted, the cyst may gradually contract and the puncture close. This favourable result, however, is seldom secured. As a rule, air enters the cyst, the opening fills up, and the fluid remaining in the cyst, or that freshly secreted, putrefies. Suppurative inflammation of the lining membrane of the cyst comes on, and is accompanied by a low form of septic fever or pyæmia, which can only be relieved by making and maintaining a free outlet for the discharge. The frequency of these consequences should make tapping through the vagina an exceptional practice. But it may be adopted in cases where an ovarian cyst is bound down in the pelvis by adhesions, and it is necessary to relieve the distress caused by pressure on the bladder and rectum. The puncture should then be made where the fluctuation is most evident, but as near the median line as possible. The canula, or an elastic catheter, may be left in the

cyst, though it is safer practice either to introduce a wire seton, or a drainage tube, so as to prevent the opening from closing, and make sure of the free and immediate escape of any fluid

that may be secreted. Whether a canula or tube be used, it is necessary to adopt some contrivance to prevent it from slipping out; and I find a piece of wire doubled at the inner end answers this purpose well. The ends open out, as shown in this drawing, when passed beyond the end of the canula or tube, and maintain either in the cavity until the wire is withdrawn.

Many years ago, before I had much experience in ovariotomy, I saw a lady with Dr. West, whose case appeared to us both to be a very favourable one for the operation; but as fluctuation could be distinctly felt through the vagina, we both thought that tapping by the vagina might be less hazardous than ovariotomy, and I accordingly emptied the cyst by vaginal tapping. Complete relief was afforded, but only for a short time. Symptoms of suppurative inflammation of the cyst showed themselves, and much purulent matter was removed at the second tapping. The patient went to Bristol, and was most ably attended there by Mr. Cross, the discharge being persistently kept up; but she died in about a year. The detailed notes of the case have been lost, but I have not forgotten the impression which it made upon me.

In the following case, vaginal tapping and drainage was completely successful in leading to a perfect cure. In June 1861 I was consulted by a lady, 32 years of age, on account of an abdominal tumour which extended just above the umbilicus, rather more to the left than to the right side, and which completely filled the pelvis. She had been married ten months when she consulted me, and two months before marriage she had consulted an eminent physician who said that she had a small fibroid tumour of the uterus, that she might marry, but that she was not likely to have children. Soon after marriage the tumour increased, particularly towards the left side, and pressure on the bladder led to retention of urine and catheterism. In March, Dr. Ferguson said it was a fibrous tumour which had better be left alone. Soon afterwards, Dr. Waller said she had both an ovarian and a fibrous tumour, and two days before I saw her Mr. Baker Brown said she had a fibrous tumour which he proposed to 'gouge.' My first impression was that the tumour was ovarian, closely attached to the uterus, but not a uterine tumour. I saw her occasionally during the next six months, the abdominal portion of the

tumour increasing, and the pelvic portion becoming harder and pushing the uterus closer to the symphysis pubis. In March 1862, vomiting and other symptoms having become distressing, vaginal tapping was agreed upon in consultation with Dr. West. On March 20, I passed a trocar into the most prominent part of the swelling in the posterior vaginal wall. About ten ounces only of thick bloody fluid came away. The next day she was pretty well. On the 22nd, the catamenia came on with sickness. On the 25th, vomiting was increased, but was relieved next day after iced champagne, and using turpentine injections. On the 27th, a very copious vaginal discharge came on with some odour. On April 5, Dr. Bunce, of Woodford, wrote: 'The discharge still continues, and has done so all the week; she has been very weak at times and faint.' On the 7th, he wrote again: 'The discharge has continued till this morning, thinner and lighter in colour, and excessively fetid; there is now but little discharge, with less fetor; there is considerable diminution in the size of the abdomen, which is soft and flaccid except on the left side, where there is a hard lump. Sickness has ceased, she takes plenty of nourishment, and is in good spirits.' On the 11th, I found her up and pretty well. There was still some swelling in the left iliac region, but all the rest of the abdomen was clear on percussion; discharge had almost ceased, and the uterus was nearly in its normal position, but large and low down. She went on well till the 16th, when fetid ovarian fluid again began to escape by the vagina. She was sick and weak for some days, but went to Brighton in May, and returned in June, a little discharge still continuing. In July some abdominal swelling low down could still be felt, but she was in excellent health. In August, symptoms of early pregnancy showed themselves. In September, there was smart flooding, and apparently an abortion of about ten weeks. In October, there was excessive catamenial discharge, lasting six days. In the spring of 1863, she again became pregnant, and all through her pregnancy had occasional discharges from the rectum of what appeared to be ovarian fluid, but a healthy child was born on December 29, 1863, and Dr. West informed me that the labour was quite natural. A second child was born in 1865, and a third in 1866. Two other children have been born since, the last in May 1870;

and she remained quite well till 1879, when she died of some other disease.

In April 1862 a married woman, 30 years of age, was in the Samaritan Hospital with an ovarian tumour, which occupied the whole of the left side of the abdomen, and could be felt by the vagina and rectum behind the uterus, quite filling up the pelvis. She had suffered considerably from the pressure of this tumour for about four years. On April 17, I tapped with Scanzoni's trocar behind the uterus, but only about a pint of ovarian fluid escaped. She left the hospital in a few days much relieved. I heard afterwards that vaginal discharge continued for a considerable period, and became purulent, that the abdominal tumour gradually disappeared, and that she regained good health. I have lost sight of her, and on writing to her address the letter was returned, marked 'Gone away.'

In August 1866, I saw a young married lady with a circumscribed collection of fluid in the right iliac region. She was married in May 1861, went to Ireland in the following September, was taken ill there with irritable bladder, scanty urine, and difficulty in passing it; suffered a good deal during a voyage to India; and, on landing at Bombay in 1862, a basin full of 'white stuff like matter' came away by the rectum. After this she was well till December 1865, when increase in the abdomen began as she was travelling in India, and continued slowly until I saw her. On August 14, 1866, I tapped with a very fine trocar just above the pubes, on the right side, and removed with an exhausting syringe three pints of ovarian fluid. Immediate relief was obtained, and she felt quite well till November. Then some pain and swelling began on the left side, just behind the left hip, in the same place that she felt it when going to India in 1862; but I could not detect any abdominal or pelvic tumour except a little thickening in front of the cervix uteri. After this she was occasionally treated by Dr. Priestley for dysmenorrhœal pains; and I did not see her again till March 1868, when I examined her in consultation with Dr. Priestley. She then had an elastic tumour of about the size and situation of the gravid uterus of six months. The right side of the vagina was deeply depressed, pushing over the uterus to the left. Distinct fluctuation was perceptible from the abdomen to the vagina. We agreed to

tap by the vagina, and drain the sac after the next menstrual period. On March 18, 1868, I introduced Scanzoni's trocar to the left of the uterus, and removed three and a half pints of clear ovarian fluid, leaving the elastic canula in the cyst and vagina. On the 19th and 20th, she was rather feverish. On the 21st, I injected some weak solution of iodine. On the 22nd, no discharge coming through the tube, I removed it. As it came away several ounces of fluid escaped, as if from Douglas's space rather than from a cyst. She was feverish, with a coated tongue and rapid pulse, and went on till the 27th without any vaginal discharge. There was increasing tension over the pubes, but with clear sound on percussion, as if air were in the cyst. Dr. Priestley succeeded in introducing a uterine sound through the vaginal opening. Some gas and fetid fluid escaped. On the 28th, I put in a vulcanite tube, and, with a syringe fitted to it, drew out several ounces of very fetid fluid with bubbles of gas. I repeated this on the two following days, the tube being left in the cyst, and free purulent discharge going on through it. On April 2, the nurse accidentally pulled out the tube. In the afternoon I found that a full inch of the tube was broken off, and as it could not be found we feared that it might be in the cyst. On April 3, I put in a laminaria tent to enlarge the opening. On the 4th, I proceeded to remove the tent, but the string attached to it cut through the softened laminaria, and the tent was left inside the cyst. I tried to catch it with forceps, but could not; so I introduced a sponge tent in order to widen the opening still further. On the 5th, Dr. Junker administered chloroform, and I dilated the opening by the hysterotome; but neither with my finger, nor forceps, nor with the lithotrite, could I find the laminaria tent, and I supposed that the vegetable matter must have been softened and come away with the discharge. The cavity felt large, but so circumscribed that it was clearly a cyst and not Douglas's space. I put in one of Dr. Wright's steel expanding stem dilators. This remained for a fortnight, and I removed it on April 20. All that time fetid purulent discharge had gone on, more or less with occasional pain and want of appetite, and something hard could be felt to the right side of the uterus as if the laminaria tent were still there. She went to Brighton and called on me on May 14, on

her return, much improved in health. The discharge had almost ceased; there was no abdominal swelling; but I could distinctly feel something hard close to the opening in the vagina and to the right side of the uterus. Fearing to do harm by attempting to remove it, if it were the tent, I advised her to go into the country. She wrote to me in June that she was gaining strength, but that the discharge continued yellowish and not offensive, and in larger quantities soon after the monthly periods. I did not hear of her again till Dr. Priestley wrote to me in January 1869, saying 'Our old patient came to me, complaining of much discomfort, and copious discharge mixed with blood. I found some foreign body lying in the fistulous opening, and after a little trouble caught it with a pair of forceps. It turned out to be the missing laminaria tent, which must have been there since last March. It still retained its form, and although slightly fetid, was much less so than one might have expected. She was here again to-day, much relieved, and the aperture seems disposed to contract.' She soon regained good health, and I saw her in the summer of 1871 perfectly well, no sign of abdominal or pelvic tumour being discoverable. I heard of her lately in good health.

In the following case vaginal tapping and drainage were followed by good health for three years, but the patient then died with symptoms of pyæmia and abscess of the liver. A married woman, 36 years old, was sent to me by Mr. Chesterman, of Banbury, and was admitted to the Samaritan Hospital in December 1863. She had a tense, tender tumour on the left side of the abdomen, extending as high as the umbilicus. The anterior wall of the vagina was depressed, especially on the left side; the uterus was very high, so that it could scarcely be reached by the finger, and the bladder was pulled up with it. Catamenia quite regular. The symptoms had not been complained of more than six months. On January 4, 1864, I tapped in the middle line of the vagina and evacuated thirty ounces of green, albuminous fluid, sp. gr. 1025. A canula was left in the cyst and fixed there. She had a restless night; slight rigor and some pain the next day. On the 6th, iodine solution was injected through the canula night and morning; 7th, scarcely any pain, and the canula caused no annoyance. Two hours after the injection of iodine pain

became severe, and was followed by profuse sweating; 8th, nothing having come through the canula since the iodine was injected, it was removed, and, after its removal, some greenish, albuminous fluid continued to drain away for the next two days. The discharge ceased, and she was pretty well till the 18th, but suffering occasionally from pain and feverishness. On the 18th, after an attack of violent pain and vomiting, profuse and very offensive vaginal discharge took place, and continued on the 19th. On the 20th, there was severe pain in the left shoulder, which continued on the 21st, but without sweating. On the 22nd, the pain in the shoulder subsided, and the discharge became less offensive; but from the 23rd to the 27th it was very free, purulent, and excessively offensive. She expressed a great wish to return home, and did so on February 2, improved in general condition, but with a very offensive discharge continuing. At the end of a month, Mr. Chesterman wrote that she was 'getting fat and strong, and saying that she felt better than she had been for the last ten years.' I heard of her again in June 1865, when she said she had remained well till a month before, when she had some fetid discharge, which lasted for three weeks, and then ceased. The uterus felt fixed, but there was no other sign of disease. On November 15, 1867, Mr. Pemberton, of Banbury, wrote to say that this patient had died after an illness of about ten days. 'She had been exceedingly well for twelve months or more prior to this attack; the tumour had become so small as scarcely to be felt through the abdominal parietes; and she rarely had any pain, but occasionally a little uneasiness followed by a discharge from the vagina, when all felt well again. She had been out for many hours in the wet, and was seized with acute pain over the hepatic region, and great tenderness down the right side towards the hip. The tumour, you will remember, was on the left side; all her pain now was referred to the right side, immediately below the ribs; and, a day or two before death, there was œdema, extending from the hepatic region to the right thigh, limited to the right side only. Mr. Chesterman concluded from this, that there was some obstruction to the circulation, and probably abscess in the liver. I very much regret to add, that I was unable to obtain a post-mortem examination.' Whether

a freer opening in this case might have prevented the re-formation of fluid or pus in the cyst is a question which suggests itself; and I may state that the impression left on my mind by what I have seen of vaginal tapping, leads me to the conclusion that simple tapping is more hazardous than tapping followed by drainage, and that drainage should be so complete that no reaccumulation of fluid can take place, the cavity being kept open until its walls collapse and unite, so that it is completely obliterated. Even then patients are so apt to suffer from some of the ill-effects of long-continued suppurative processes, that I am more than ever confirmed in the opinion that it is better, even at considerable risk, to remove a cyst, if at all possible, than to trust to any mode of drainage.

TAPPING THROUGH THE RECTUM

has been supposed to possess some advantages over tapping through the vagina. It was said that there would be no constant discharge of offensive fluid, for any ovarian fluid which entered the rectum would be retained, just as a liquid motion is retained by the sphincter ani, and discharged when the patient pleased. But a dysenteric tenesmus has been occasionally observed, which has proved very distressing, and fatal inflammation has followed entrance of fæcal gases into the cyst. I had one such case with Dr Priestley. We tapped an adhering cyst through the rectum, and the patient died some days afterwards of cyst inflammation. The cavity was filled with fæcal gas.

It was supposed that the objection to vaginal tapping from entrance of air into the cyst would be guarded against in rectal tapping by the contraction of the sphincter ani. But the entrance of fæcal gas into a cyst would be quite as likely to occur, and would probably be more injurious than the entrance of atmospheric air in vaginal tapping.

INJECTION OF IODINE.

Notwithstanding the strenuous advocacy of Boinet, the practice of injecting ovarian cysts with iodine has quite fallen into desuetude, and, so far as my own trials and means of observation enable me to judge, not in any way to the disadvantage

of patients. The few cysts which I injected and which did not refill for several years, were single, with limpid contents; and in such cysts I believe simple tapping is quite as effectual alone as it is with the injection of iodine in addition.

The only cases in which iodine injection is really useful, and where its employment should be recommended, are those in which, after tapping either by the abdominal wall, vagina, or rectum, cyst inflammation has occurred, and the patient is suffering from absorption of the decomposing contents of the cyst. Here free drainage becomes necessary to save the patient from pyæmia or septicæmia; but she may suffer considerably in appetite and strength if the fluid which escapes is offensive; and it ought to be deodorized. For this purpose iodine, or phenol, or sulphurous acid, or chromic acid may be used in tolerably strong solution; and iodine I used to think preferable to all the others. A solution of one part of iodine and two of iodide of potassium to twenty parts of water was used night and morning, injected through the catheter after washing out the cyst with warm water; and the greater part of the iodine solution injected allowed to run away again at once. But a little was left in the cyst, partly to act on its walls and partly to deodorize the fluid contents of the cyst if they putrefied. Latterly I have had reason to prefer sulphurous acid to iodine. I have used with excellent effect a mixture of one part of the acid of the British Pharmacopœia with six or eight parts of tepid water.

TREATMENT BY INCISION.

The practice of laying open ovarian cysts by incision no doubt arose when, during tapping, the instrument used proved to be too small for the escape of thick fluid. On withdrawing the canula it would be found filled with glue-like matter, and similar matter would be observed exuding from the opening. The natural result would be that the surgeon would enlarge the opening, until the contents of the cyst could escape or be squeezed out. This has occurred to me more than once. I was present when Mr. Armstrong Todd tapped a young lady. After a little fluid had escaped, the canula became clogged with hair and fat, and it was withdrawn. Fluid continuing to ooze

away, the opening was enlarged until first one finger, then two, and then a tablespoon could be used to scoop out many pounds of semi-solid fat, with masses of hair and bony spiculæ, from a cyst which was intimately adhering over a large extent of the abdomen. Ovariotomy was proposed to the parents, but as the unfavourable conditions were explained to them at the same time as the possibility of a cure by the incision was also pointed out, they preferred the latter alternative, and the patient only survived a few days.

In another case, with Mr. Taunton, of the Commercial Road, where the contents of a large cyst consisted of very thick colloid, I made an incision of about two inches long, and squeezed out many pounds of matter as thick as calf's-foot jelly. In this case considerable relief was given for a time, but the patient ultimately died exhausted from the continuous discharge.

In the cases hereafter described, where it has been impossible to complete ovariotomy, and the cyst, or a portion of it, has been left within the abdominal cavity, the edges of the opening in the cyst have been fixed to the abdominal wall by suture, and such cases have become similar to those treated by incision. I have not adopted the practice under any other circumstances, but it has been repeatedly done by others, and various means have been taken to prevent the escape of the fluid into the abdominal cavity. Adhesion between the cyst and the abdominal wall has been secured by caustic issues, or by the insertion of needles, or by the use of special instruments, or by suture after laying bare the cyst. As soon as adhesion was believed to be complete, the incision was made, and the cyst kept open until the obliteration of its cavity took place. So far as I can learn, from my own experience and the study of recorded cases, this practice is far more dangerous than ovariotomy, and very much less likely to be followed by complete cure. I think, therefore, it should only be considered admissible in cases where ovariotomy cannot be completed. Then after incision and emptying the cyst as far as possible, and securing the opening in the cyst to the opening in the abdominal wall, the cavity is kept empty by draining and the injection of disinfecting or deodorizing agents. The conditions are then the same as those of a drained abscess.

CHAPTER V.

THE RISE AND PROGRESS OF OVARIOTOMY.

OVARIOTOMY. From *ὠάριον*, ovary; and *τομή*, incision. [Syn. *Ovariotomie*, Fr. and Ger.—*Ovariotomia*, Ital. and Sp.] Definition: The operation for the removal of one or both ovaries. As it is only performed by surgeons when one or both ovaries are diseased, it is a very different proceeding from the extirpation of healthy ovaries, which has been practised from remote antiquity to the present time on domestic animals for economical purposes, and both in ancient periods and in the middle ages on women, almost exclusively for immoral purposes. Galen, in his work 'De Semine,' records that in Eastern Asia and in Cappadocia, sows were spayed in order to fatten them, and to improve the flavour of their meat. He also points out the greater difficulty and danger of this operation than the castration of male animals: 'Non tum ita tutum in fœminis testium extractio administrari potest ob sedem in quâ collocati sunt; . . . majusque in hoc quam in maribus periculum est.'

We find a passage in Pliny's 'Historia Animalium' (lib. viii. c. 77):—'Castrantur suis fœminæ quoque, sicuti cameli, post bidui inediam suspensæ pernis prioribus, vulva recisa; celerius ita pinguescunt,' which appears dubious, whether castration or infibulation is alluded to.

In Book ix. of *Περὶ Ζώων Ἱστορίας* of Aristotle, the castration of cows and camels is mentioned.

Athenæus, in *Δειπνοσοφιστῶν* (lib. xii. c. 9), relates a story of Andramystes, a Lydian king, who kept castrated females instead of eunuchs in the service of his harem; and Gyges, another Lydian king, is reported to have had several of his

concubines castrated, in order to prolong the charms of their youth.

Omitting some apocryphal records of later periods, we pass on to several writers of the seventeenth and eighteenth centuries, as Vierus, Riolan ('Opera prima,' Paris, 1610; 'Anatome,' p. 142), Diemerbroeck ('Anatomia corporis humani,' Lyon, 1679; I. I. c. xxiii.), Boerhave ('Prælect. Academ. in prop. inst.' f. 5, pars 2 and 669), Graaf ('De Mulierum Organ. Generat. inserv. Tract. nov.' cap. 13), Plater ('Observ. libri tres,' Basle, 1680, p. 248), &c., who either mention the extirpation of the ovaries as having been performed, or propose this operation in the treatment of nymphomania. And at the present day it seems to be a common practice among some of the natives at the antipodes. Dr. Junker writes me word that a paper was laid before a late meeting of the Anthropological Society of Berlin for publication in their Transactions which reports that the aborigines of Australia and of New Zealand perform ovariotomy on young girls (the age is not mentioned) by incision in both inguinal regions. They do this for two purposes: first, to prevent the propagation of hereditary diseases and deformities and other disabilities. The writer met a woman born deaf and dumb who had been spayed to hinder her from bearing deaf and dumb children. Their second object is to keep up a supply of barren prostitutes who live excluded from the society of other females and associate with the unmarried men, whom they follow in the bush. These women have their breasts either undeveloped or very small, from which it is inferred that they are mutilated at different ages. They never grow very fat, and the buttocks do not become so large as those of other women. They are however strong and capable of bearing great fatigue. For the same reason of personal defect men are made impotent by slitting up the urethra as far as the membranous part; and if they marry and wish to perpetuate their name custom authorizes their wives to cohabit with other men.

So far, by all these writers, the removal of sound ovaries from strong and healthy individuals, placed under the most favourable circumstances, was proposed or commented on. In the present day a diseased organ is extirpated from a person more or less weakened and distressed by long suffering. The

ancient operation was the pander to luxurious vice and immorality. Modern ovariotomy, when successful, rescues the victim from otherwise hopeless suffering and certain death, and, even when unsuccessful, mercifully shortens her martyrdom.

It was not earlier than in the seventeenth and eighteenth centuries that ovariotomy was proposed and suggested as a radical cure for diseased ovaries. As late as the beginning of the eighteenth century, this operation was first performed, and it remained long in discredit. It is only within the last five-and-twenty years that it has been at all frequently or generally practised.

Theodor Schorkoff, in his 'Dissertatio medica inauguralis de Hydrope Ovarii' (Sept. 7, 1685), expresses the belief that the extirpation of dropsical ovaries would lead to a permanent cure, if the operation itself were less cruel and hazardous.

Schlenker, in the 21st thesis of his dissertation 'De singulari ovarii sinistri morbo' (1722), proposes the question whether a radical cure of diseased ovaries might not be effected by the removal of the organ through an incision in the abdomen; but he leaves the answer to his more experienced colleagues.

Soon after him, Willius, of Basle, published (in 1731) a pamphlet, 'Specimen medicum sistens stupendum abdominis tumorem,' which contains the following passage: 'When, however, the dropsy fills all the chambers of the ovary, when the fluid is thick and viscid, and no hope of recovery is entertained, we question whether such an ovary ought not to be extirpated, and so the root and cause of the disease be removed. We know from experience that severe and large abdominal wounds have healed; they are not likely to prove more dangerous in the case of attempting a cure by excision of the ovaries.' Notwithstanding this advanced view, he still shrank from the execution of the operation, afraid of the extent of the incision required to remove large tumours; of the adhesions likely to be met with; the pain inflicted; the hæmorrhage, the exposure of the abdominal viscera, and its fatal consequences. Giovanni Targioni Tozetti recommends the extirpation of the ovaries as a last resource, when all other curative means have failed. ('Prima raccolta di osservazioni mediche,' Firenze, 1752, p. 78.)

Ulric Peyer ('Acta Helvetica,' t. t. Basil, 1751, app. 1); Theden ('Nova acta, nat. curios.,' tom. v. p. 289), and Delaporte ('Mémoires de l'Académie Royale de Chirurgie,' 1833, p. 757) recommend the extirpation of ovarian tumours; and Morvand, the Secretary to the Academy, prophesies the ultimate triumph of this operation with the words: 'Modern surgery is capable of great achievements; unlimited roads ought to be opened to her goal—to cure.'

Antony de Haen ('Ration. Medend.,' part iv. cap. 5, § 2) and Morgagni were opposed to the operation, which W. Hunter and Van Swieten ('Commentaries in H. Boerhave's Aphor.,' 1770, tom. iv. § 1223) justify in extreme cases.

Dr. William Hunter, in a paper 'On Cellular Tissue,' published in 1762, in the second volume of the 'Medical Observations and Inquiries,' after stating that the trocar is almost the only palliation in the treatment of ovarian dropsy, says: 'It has been proposed by modern surgeons, deservedly of the first reputation, to attempt a radical cure by incision or suppuration, or by excision of the cyst.' In support of his opinion, 'that excision can hardly be attempted,' having pointed out difficulties during the operation, and dangers following it, he concludes with the following words, which foreshadow some of the modifications in the operation, by which ovariotomy, once stigmatised, has become one of the most brilliant triumphs of modern surgery: 'If it be proposed, indeed, to make such a wound in the belly, as will *admit two fingers or so*, and then *tap the bag and draw it out*, so as to bring its root or peduncle *close to the wound of the belly*, that the surgeon may cut it without introducing his hand, *surely in a case otherwise so desperate it might be advisable to do it*, could we beforehand know that the circumstances would admit such treatment.' (Op. cit. p. 45.)

In a lecture delivered in 1785, John Hunter says: 'I cannot see any reason why, when the disease can be ascertained in an early stage, we should not make an opening into the abdomen and extract the cyst itself. Why should not a woman suffer spaying, without danger, as well as other animals do? The merely making an opening into the abdomen is not highly dangerous. In a sound constitution, perhaps, a wound merely

into the abdomen would never be followed by death in consequence of it.'

Not many years later, ovariotomy found an enthusiastic advocate in Chambon ('Maladies des femmes. Maladies chroniques à la cessation des règles,' chap. xxxix. 'De l'extirpation des ovaires,' Paris, 1798). Adhesions, he says, do not generally render ovariotomy impossible. They are mostly found between the tumour and the peritoneum, the broad ligament, the Fallopian tubes and their fringes, sometimes the omentum and the intestines. It is not always possible to determine the extent, and the nature of the existing adhesions beforehand, when the tumour is movable. When the tumour is free, difficulties in the operation and serious accidents will seldom be met with, provided the patient is not suffering from any discrasia or is not much exhausted, and then the operation ought not to be performed. Adhesions with the omentum seldom interfere with the mobility of the tumour, in which case their diagnosis is difficult. The adherent border of the omentum may be removed without danger. Abnormal connections between the tumour and intestines will not contra-indicate the operation, unless there is a high degree of inflammation, by which the adhesion has been contracted. In such a case, the tumour will be found firmly connected with the intestines, and it will be better to abstain from the operation. Such adhesions are not only very extensive, but also very intricate, the tumour and the neighbouring intestine forming almost one mass. If it be impossible to remove the diseased parts, either a portion of the tumour must be left behind, and a protracted and dangerous suppuration would be the consequence; or a portion of the adherent viscus must be removed, which would place the life of the patient in jeopardy. He thought that all the different varieties of ovarian degeneration might be extirpated, provided none of the above contra-indications were present. The same rules apply also to the dropsy of the tubes. There are ovarian tumours which, after having attained a certain size, will remain stationary. This will be observed sometimes in scirrhus. Such cases should not be interfered with. He concludes with the words, 'I am convinced that a time will come when this operation will be considered practicable in more cases than I have

enumerated, and that the objections against its performance will cease.'

John Bell never performed ovariotomy, but Dr. Ephraim McDowell, a Virginian, practising in Kentucky, had attended Bell's course of lectures in Edinburgh, in 1794. It is said of him by his biographer, Dr. Gross, that he was 'enraptured by the eloquence of his teacher; and the lessons which he imbibed were not lost upon him after his return to his native country. Bell is said to have dwelt with peculiar force and pathos upon the hopeless character of ovarian tumours when left alone, and of the practicability of removing them by operation. It is not improbable that the young Kentuckian, while listening to the teaching of the ardent and enthusiastic Scotchman, determined in his own mind to extirpate the ovaries of the first case that should present itself to him after his return to his native country. The subject had evidently made a strong impression upon him, and had frequently engaged his attention and reflection. He had thoroughly studied the relations of the pelvic viscera in their healthy and diseased conditions, and felt fully persuaded of the practicability of removing enlarged ovaries by a large incision through the walls of the abdomen.'

McDowell returned to Kentucky in 1795, and commenced practice at once; but it was not until fourteen years afterwards that he was consulted (in 1809) by a patient upon whom he first performed ovariotomy, and who survived in good health until 1814, and died after the completion of her seventy-eighth year.

No one can dispute the validity of the direct claim of McDowell as practically the first successful ovariotomist. At the same time it must be maintained, that the still greater merit of pointing out the absence of any physiological reasons against the operation, the possibility of its safe performance in the human female, and the class of cases in which it ought to be admissible, is due to the teaching of the Hunters and of John Bell. But in this country, such is the sacredness of human life, even when threatened by fatal disease; so strong is the consciousness that the introduction of innovations like ovariotomy insures the destruction or shortening of a certain number of lives during the tentative stage of the practice, that men even of the stamp of the Hunters and the Bells naturally shrank from

the responsibility, imposed upon them by their position and reputation, of adopting and inaugurating it as a part of legitimate surgery; and elected rather, in the modesty of their greatness—'stare decisis et non quietâ movere'—to content themselves by tending with careful pains the last flickerings of life in their confiding patients, and soothing, as best they might, their prolonged sufferings, than, as it would seem to them, proceed to the choice and immolation of the sacrificial victims demanded as the inevitable price of the safety of future generations, or the aggrandisement of their own fame. And it must be remembered that, at that time of day, the mortality from all operations was much greater than it is now; that the sick and diseased were more passively quiescent under their maladies and less tolerant of any surgical suggestions, just as we ourselves find to be the case among the unroused population of an outlying agricultural district; that they were not buoyed up, as modern women are, by the histories and promises of painless extirpations under chloroform or methylene; and that, without anything like mawkish sentimentalism, surgeons themselves had to encounter the 'peine forte et dure' of their suppressed sympathy, and nerve themselves up to the infliction of the most deliberate and tedious eviscerative vivisection. The disease was looked upon as a mystery, and its ending in death as a matter of course; and, instead of being accompanied, as we now see it, by fretful resistance and chafings to escape, it only led to stolid endurance or religious submission; and, on the part of the profession, to pity and endeavours to alleviate the inevitable misery.

But McDowell was a free man, in a new country, clear from the conventional trammels of old-world practice, found his patients in the most favourable conditions of animal life, seems to have had one of those incomprehensible runs of luck upon which a man's fate and reputation so often turn if he has the sagacity and energy to put such fortunate accidents to good account, and was happy, as those usually are who can afford or constrain themselves to wait, in finding suitable time, place, persons, and opportunity for working into fact the notions of his tutor Bell. He lost only the last of his first five cases of ovariotomy, and thus, as it were, established at the outset what until recently was complacently regarded

as a satisfactory standard of mortality for so serious an operation.

The details of his first operation, as recorded by Dr. Gross, are interesting enough for repetition, and supply the best testimony to his sagacity, firmness, and caution:—

'It was performed on Mrs. Crawford, of Kentucky, in December 1809. The tumour inclined more to one side than the other, and was so large as to induce her professional attendant to believe that she was in the last stage of pregnancy. She was affected with pains, similar to those of labour, from which she could find no relief. The wound was made on the left side of the median line, some distance from the outer edge of the straight muscle, and was nine inches in length. As soon as the incision was completed, the intestines rushed out upon the table; and so completely was the abdomen filled by the tumour that they could not be replaced during the operation, which was finished in twenty-five minutes. In consequence of its great bulk, Dr. McDowell was obliged to puncture it before it could be removed. He then threw a ligature round the Fallopian tube, near the uterus, and cut through the attachments of the morbid growth. The sac weighed seven pounds and a half, and contained fifteen pounds of a turbid, gelatinous-looking substance. The edges of the wound being brought together by the interrupted suture and adhesive strips, the woman was placed in bed and put upon the antiphlogistic regimen. "In five days," says Dr. McDowell, "I visited her, and, much to my astonishment, found her engaged in making up her bed. I gave her particular caution for the future; and in twenty-five days she returned home in good health, which she continues to enjoy."

'It will not be uninteresting here to state that Mrs. Crawford, at the time of the operation performed upon her by Dr. McDowell, lived in Green County, Kentucky, from whence she removed, some time afterwards, to a settlement on the Wabash River, in Indiana, where she died, March 30, 1841, in the 79th year of her age. There was no return of her disease, and she generally enjoyed excellent health up to the period of her death. She had no issue after the operation. The youngest child, Mr. Thomas H. Crawford, who has kindly communicated to me these facts, was born in 1803, nearly six years before the operation.'

Dr. McDowell was a kind-hearted, amiable man, an accomplished scholar, though no writer, indifferent to notoriety, but with an extensive reputation. As a surgeon, he was exceedingly cautious, calm, and firm; paying great attention to the details of his operations and treatment, and selecting and drilling his assistants with much care.

In person he was nearly six feet in height, with a florid com-

E. McDowell

Aet 56,

plexion, and very black eyes. He was of a remarkably happy disposition, and rather inclined to corpulency. Up to the time of his last sickness, he was one of the most active men in Kentucky. Dr. McDowell remained faithful to his profession until the last moments of his life. He died, literally, in harness. The portrait above is copied from a photograph taken from an oil painting now in possession of the family, and sent to me by Dr. Jackson, of Danville, Kentucky, who informed me that the painting was by Jewett, taken when the sitter was in his fifty-sixth year, and was deemed by his family an excellent likeness.

McDowell was buried in the cemetery near the scene of his life-work, and there rested tranquilly, his memory respected and his good deeds bearing their fruit, till in 1879 it was deemed a fitting thing to perpetuate the world-wide association of his name with ovariotomy by a granite obelisk and some characteristic inscriptions.

In 1808, one year before Dr McDowell's first operation, D'Escher ('Considérations médico-chirurgicales sur l'hydropisie enkystée des ovaires.' Thèse: Montpellier, 1808) suggested the removal of diseased ovaries through an incision along the external border of the rectus muscle. Existing adhesions should be detached with the fingers, or, if necessary, with a bistoury; the tumour extracted and excised after the application of a ligature around the pedicle. The ends of the ligature were to be brought out by the wound, the edges of which were kept in close opposition by lateral pads and a bandage around the body.

McDowell's case has long been considered the first case of ovariotomy on record; for the operation of L'Aumonier of Rouen, in 1776—which had been referred to as one of ovariotomy, and which even Dr. Atlee, in his table (published in 1851), enumerated as the first operation of ovariotomy—was in a case of pelvic abscess, which he opened by an incision through the wall of the abdomen above Poupart's ligament, six or seven weeks after parturition. He seems also to have separated the fimbriæ of the Fallopian tube from the sac of the abscess, and to have removed the ovary without any necessity, and without any idea of ovariotomy. His case may be found recorded in the 'Histoire de la Société royale de la Médecine,' 1782, tom. v. p. 298.

Another case, included in some of the tables of ovariotomy by Professor Dzondi, is one in which a pelvic tumour was cured by drawing out a cyst through an incision in the abdominal wall of a *boy* twelve years old.

Atlee, however, communicated (in the 'American Journal of Medical Sciences,' vol. xvii. 1849, p. 534) a case which claims the priority to that of McDowell by more than a century. It is the case of Dr. Robert Houstoun, which may be found under the head, 'A dropsy of the left ovary of a woman, aged fifty-three years, cured by a large incision made in the side of the

abdomen,' in the 'Philosophical Transactions' (from the year 1719 to 1733), abridged and disposed under general heads, vol. vii. p. 541 (London, 1734). From this case it will appear that ovariotomy originated with British surgery, on British ground, inasmuch as though the operation was not one of complete excision of the tumour, it was planned with that intention.

Dr. Robert Houstoun operated, in August 1701, on a Mrs. Margaret Miller, near Glasgow, who since her last confinement, thirteen years before, when twenty-three years of age, suffered from ovarian dropsy. The tumour had grown to a monstrous bulk; she was much wasted, had great difficulty in breathing, want of appetite and sleep, and bed-sores from long confinement. This case is in many respects a very curious one, and the operator's own words are worthy of record. He says: 'After having obtained the patient's consent that, in order effectually to relieve her, I must lay open a great part of her belly, and remove the cause of all that swelling. . . . I prepared without loss of time what the place would allow, and with an imposthume lancet laid open about an inch; but finding nothing issue, I enlarged it two inches; but even then nothing came forward but a little thin yellowish serum, so I ventured to lay open two inches more. I was not a little startled, after so large an aperture, to find it stopped only by a glutinous substance. All my difficulty was to remove it. I tried my probe—I endeavoured with my fingers, but all was in vain; it was so slippery that it eluded every touch and the strongest hold that I could take. I wanted in this place almost everything necessary, but bethought myself of a very odd instrument, but as good as the best, because it answered the end proposed. I took a strong fir-splinter, wrapped some loose lint about the end of it, and thrust it into the wound; and by turning and winding it, I drew out about two yards in length of a substance thicker than any jelly, or rather like glue that is fresh made and hung out to dry; the breadth of it was above ten inches. This was followed by nine full quarts of such matter as I have met with in steatomatous and atheromatous tumours, with several hydatids of various sizes containing a yellow serum, the least of them bigger than an orange, with several large pieces of membrane, which seemed to be parts of

the distended ovary. Then I squeezed out all I could, and stitched up the wound in three places, almost equidistant. The lower part of the wound was kept open by a small tent. Some serosity discharged from it for four or five days. The wound was covered in its whole length with a pledget spread with some home-made balsam, over that several compresses dipped in warm brandy, then several towels; all these dressings were fastened by swathing her round the body. An anodyne was given several times a day. The next morning the patient was found much refreshed by a good night's rest, the first she enjoyed for three months past. After three weeks she was able to sit outdoors, wrapped up in blankets, superintending her farm-labourers. She recovered, and lived in perfect health from that time till October 1717, when she died after ten days' illness.'

Although this isolated case of Dr. Houstoun undoubtedly strengthens the claim of British surgery to the honour of originally practising ovariotomy, it will hardly deprive Dr. McDowell of his undeniable merit of having been the first who, guided by scientific principles, enriched modern surgery with the operation. He followed up his first case by others. He performed the operation thirteen times altogether between 1809 and his death in 1830. The precise number of deaths cannot be ascertained, but of eight cures there can be no doubt. McDowell's successes were followed up by other American surgeons. In 1822, Mr. Smith, of Connecticut, performed a successful operation. He removed a cyst containing six pints of fluid, through an incision five inches long. He broke down extensive adhesions between the tumour and the abdominal wall and the omentum. The wound was united by means of adhesive plaster and roller. No unfavourable symptom occurred until the separation of the ligature, when an abscess formed, which had to be opened. The patient, twenty-three years of age, was able to walk after three weeks, and speedily recovered. (Case of ovarian dropsy successfully removed by a surgical operation, 'Edinburgh Medical and Surgical Journal,' 1822; and 'American Medical Recorder,' Philadelphia, vol. v. 1822, No. 7.)

In another case Smith was unable to complete the operation on account of extensive adhesions. He emptied the cyst, and

the patient recovered. But the cyst filled again. ('Med. and Surg. Memoirs,' p. 231.)

In 1823, G. Smith removed an ovarian tumour from a negro woman, through an incision extending from the umbilicus to the os pubis, after having previously emptied the contents of the cyst. The peduncle was secured by a ligature. The patient recovered within twenty-five days. ('North American Med. and Surg. Journal,' January 1826.)

Lizars, of Edinburgh, was the first to attempt ovariotomy in this country. He performed two operations in 1825, of which the first was successful, the second fatal in fifty-six hours. He opened the abdomen on two other occasions, but only to prove errors of diagnosis. Both patients recovered.

The first attempt to perform ovariotomy in London was made in 1827, by Dr. Granville, who operated in two cases. In one the operation was abandoned on account of the extent of the adhesions; the woman recovered. In the other case a fibrous tumour of the uterus, weighing eight pounds, was removed; but the patient died on the third day.

The ill-success of Mr. Lizars and Dr. Granville, who both operated by the long incision, brought discredit upon the operation; and it was not until 1836, nine years after Dr. Granville's failures, that a provincial surgeon, Dr. Jeaffreson, of Framlingham, acted upon the suggestion of William Hunter, and performed ovariotomy by the small incision for the first time in Great Britain. A bilocular cyst was removed through an opening only an inch and a half long. The patient was alive in 1859, was fifty-six years of age, and had given birth to one boy and three girls after the operation.

In the same year (1836), another provincial surgeon, Mr. King, of Saxmundham, successfully removed an ovarian cyst through an incision only three inches long; and Mr. West, of Tonbridge, also had a successful case, the incision being only two inches long. In 1838, Mr. Crisp, of Harleston, in Suffolk, removed a multilocular cyst through an incision only one inch long. The patient lived fifteen years after the operation, and enjoyed good health.

In 1839, Mr. West, of Tonbridge, had a second successful case; a single cyst, which contained twenty-two pints of fluid, having been removed by the short incision. Mr. West also

had an unsuccessful case of completed ovariotomy, and one in which the adhesions prevented the completion of the operation. In the same year the first attempt to perform ovariotomy in a London hospital, of which I have been able to find any record, was made at Guy's, by Mr. Morgan ; a small incision was made, adhesions were found, the tumour was not removed, and the patient died in twenty-four hours.

In 1840, Mr. Benjamin Phillips operated at the Marylebone Infirmary, and completed the operation for the first time in London ; but the result was unsuccessful.

In 1842, Dr. Clay, of Manchester, commenced his series of operations, performing ovariotomy four times, and in three out of the four with success. In 1843, he also operated four times, twice successfully. In 1843, Mr. Aston Key removed both ovaries from a patient in Guy's Hospital. His incision extended from the ensiform cartilage to the pubes, and death followed on the fourth day. Later in the same year, Mr. Bransby Cooper operated in the same hospital by the long incision, and removed a large multilocular cyst, but the patient died on the seventh day.

So that forty years ago, although ovariotomy had been performed with very qualified success in one case in Scotland, and in at least ten cases with complete success by surgeons in our own provinces, it had never been performed successfully in London. It was the good fortune of Mr. Walne to perform the first successful operation in London, in November 1842 ; and he had two other successful cases in May and September 1843. In that year, and in 1844, Dr. Frederic Bird had three, and Mr. Lane two successful cases. Mr. Lane's first patient was still alive in 1867, and had seven children. In 1843 and 1845, Mr. Southam, of Salford, and in 1845, Mr. Dickson, of Shrewsbury, published successful cases. In 1846, Mr. H. E. Burd had a case which is published in the 30th and 32nd volumes of the 'Medico-Chirurgical Transactions.' The patient recovered, and had a child two years after the operation.

In the same year Mr. Solly took advantage of an unsuccessful case which occurred in his practice in St. Thomas's Hospital, to teach his pupils and professional brethren that retraction of the pedicle behind the ligature is very likely to occur and to lead to fatal hæmorrhage, unless prevented by

great care. His clinical lecture, published in the 'Medical Gazette' in 1846, contains a masterly review of the arguments for and against the operation, which must have had considerable effect upon the mind of the profession at the time.

The year 1846 is also noteworthy in the history of ovariotomy. In the month of September Mr. Cæsar Hawkins performed the operation for the first time successfully in any London hospital. Even now, after the long interval of five-and-thirty years, with all our accumulated experience obscuring the individuality of its history, it is not only interesting but useful to look back upon this initial glimpse of success and reopen the pages of the clinical lecture which was its record and commentary. The cautious deliberation with which the operation was decided upon, the attention to all the maxims of scientific surgery which went with every step of the work, the skill and precaution with which it was executed, and the judicious after-treatment of the patient, all offered an example for imitation as much as the lecture furnished a lesson for study in the exactitude of its details, the lucidity of its expositions, and the judiciousness of its advice. It was a simple case admirably recorded, standing out in our literature as a sort of monumental standard by which we can measure ourselves, and which forces us to moderate our exultation in what has been accomplished by the proof that in the last generation there were men endowed with all the qualities of skill and wisdom which would have enabled them to do still more if their energies had not been diverted to other objects. Mr. Hawkins did not repeat the operation, and his example was not much followed by others for several years; Dr. F. Bird and Mr. Lane being the only operators in London, except Dr. Protheroe Smith, who had a successful case, although Dr. Clay continued his operations at Manchester, and successful cases were recorded by Dr. Elkington, of Birmingham, and by Mr. Crouch in 1849, and by Mr. Cornish, of Taunton, and Mr. Day, of Walsall, in 1850.

In 1850, Mr. Duffin inaugurated a new era in ovariotomy, by pointing out the danger of leaving the tied end of the pedicle to decompose within the peritoneal cavity, and by insisting upon the importance of keeping the strangulated stump outside. He acted up to this principle in a case which was

published in the thirty-fourth volume of the 'Medico-Chirurgical Transactions.'

He was brought to the resolution of adopting this extra-peritoneal treatment of the pedicle not by any accidental necessity, but by 'reflecting on the two great causes of death in unsuccessful cases of ovariotomy, and the three several periods at which a fatal termination may occur, viz. from shock, from peritonitis, and at a later period, caused, as it appears, on separation of the slough, by putrefactive decomposition within the peritoneal cavity.' It suggested itself to him that 'this latter consequence, as well as the irritation caused by the ligature in the abdomen, might be obviated by keeping the tied portion completely out of the cavity.' He determined, therefore, to do so by fixing the tied end of the pedicle outside the edges of the wound; but as he found the length of stump that he had to deal with not sufficient for this, he was obliged to content himself by stitching the cut extremity and ligature in the wound so as to prevent them receding into the pelvis, and to retain them in that situation till the ligature should come away. It answered completely. The wound was entirely healed and the patient well on the twenty-second day. The only objection was the dragging of the abdominal wall towards the spine; but no adhesions formed, and the abdomen soon returned to its natural form.

Whatever may be our opinions and practice at the present time, and whatever views we may hold upon the question, whether this extra-peritoneal treatment of the pedicle has advanced or retarded the success of the operation, Mr. Duffin's arguments undeniably led to great changes and results:—to the use of the clamp and to all the modifications of treatment attendant upon it, and ultimately to researches as to the physiological and pathological phenomena of ligatured stumps within the peritoneal cavity, and to the study of the important subject of drainage by Kœberlé and others.

Some German writers think that the credit here given to Mr. Duffin should be awarded to Stilling, because in 1841 he published a case in which he sewed the pedicle with a part of the cyst between the lips of the wound in the abdominal wall, after he had stopped the bleeding from some of the vessels by torsion, and from others by ligature and the cautery. But this

can hardly be called a truly extra-peritoneal treatment. It is more like what Langenbeck in 1851, and Storer in 1867, described as 'Einnähen,' or 'pocketing the pedicle.' It was after Duffin that Stilling adopted a more complete extra-peritoneal method by transfixing the pedicle with a needle, which, after the pedicle was tied, fixed it outside the closed wound. Martin afterwards thus far varied Stilling's method, sewing only the peritoneal coat of the pedicle, instead of the base of the tumour, to the abdominal wall.

I began work in London in 1853, and in the following year joined what is now called the Samaritan Hospital. Dr. Savage, who is at present senior consulting physician, is the only one of the acting staff who was then connected with it. We had at the beginning only a small house in Orchard Street, which was pulled down several years ago. On the ground floor were an office and a waiting-room, and a dispensary downstairs; on the first floor the patients mustered in the front room and were attended to in the back. On the second floor there was a room for the matron, and another for a resident house surgeon, whose chief occupation was in bandaging the ulcerated legs of a crowd of out-patients. On the third floor there were attics, one of which was occasionally made use of for an in-patient. At this time I did nothing but out-patient work, and in January 1855 went off to the Crimea. But in the April before I had made my first acquaintance with ovariotomy. Baker Brown invited me to see him operate, and I went with Mr. Nunn and assisted him. It was his ninth case, a dermoid cyst with adhesions, which made the proceedings long and troublesome. Nine days after the patient died of what we can now recognize as septicæmia. This so influenced Brown that he only did one more case, and that unsuccessfully, during the next four years and a half, saying that 'it was of no use, peritonitis would always beat one.' I was not favourably impressed, but had learnt how some of the great difficulties might be overcome so far as the operation itself was concerned. Away from England, in all the excitement of war-surgery, of course the subject was at rest. But after my return in 1856 I resumed out-patient work in Orchard Street. Snow Beck, Graily Hewitt, and Priestley had joined the staff, so had Routh and Wright, and we began to hope for something more than dispensary practice. By arrangement

with the matron a bed could every now and then be obtained in an attic. Snow Beck set the example and operated on a case of vesico-vaginal fistula with the cautery and cured it. We did not often see cases of ovarian disease at that time, but they did appear occasionally. In one case I had proposed to attempt ovariotomy, but it was decided that a trial should be given to the treatment by injection of iodine. As I have said, Brown had given up the operation; very few others were attempting it, and most men were lapsing into the old state of indifference, if they were not loudly protesting against it. During the autumn of 1857 a young woman was under treatment for what appeared to be an ovarian tumour on the left side. Various opinions were confidently expressed that this could not be an ovarian tumour, because intestines could be felt in front of it. But I determined to see what it was, and in December 1857, twenty-four years ago, I prepared for my first ovariotomy. Reflecting upon all the ways and forms of using the ligature, I had resolved to use the écraseur for the division of the pedicle, as was done some months after the publication of my suggestion by Dr. John L. Atlee, of Lancaster, Pa. We cleared out the waiting-room, got a bed there, and secured a nurse. Quite a crowd of visitors came. As soon as I opened the peritoneum, and it was proved beyond all doubt that the tumour was behind the intestines, I was induced very unwillingly to close the wound and do nothing more. The patient recovered without any bad symptom, but died four months afterwards in St. Bartholomew's Hospital, when it was found that it was a tumour of the left ovary, which might have been removed quite easily. This was not encouraging for a beginner, but it attracted the notice of Mr. Bullen, of the Lambeth Workhouse, and he offered me a patient then in his infirmary who had been tapped three times in Guy's Hospital and four times in the Lambeth Workhouse, and had had iodine injected. As she was willing to face any risk, I did ovariotomy for her in February 1858. The pedicle was treated by whipcord ligature, the ends hanging out at the lower angle of the wound after the fashion of Clay, Bird, Brown, and the earlier ovariotomists. At that time we had a house-surgeon, Mr. Cooke, afterwards of Clovelly, and greatly owing to his constant care the poor girl recovered. She became a nurse in the hospital, went into service, then

emigrated, and I heard of her several years afterwards, in 1868, married to the German overlooker of a large estate in Queensland, whose salary was 240*l.* a year. Had ovariotomy not been performed she must have died in 1858 a pauper in a workhouse.

Between this first case, in February 1858, and the second in August of the same year, we had left the old house and removed to that in Seymour Street, where the hospital now is, and the second operation was done in one of the rooms in which I have since completed my long series of 408 hospital cases.

The third case was in the following November, and happily all the three women recovered. Had they died, such was the state of professional opinion at that time, the progress of ovariotomy might have been sadly retarded, if not stopped.

I lost my fourth ovariotomy without being able to account for the death. It was the first post-mortem I had occasion to make, and, though not knowing exactly what to expect, the state of the inner surface of the wound was far from satisfactory. Dr. Aitken assisted me, and he found that the hare-lip pins which I then used as sutures were bare on the inner aspect of the abdominal wall, the cut edges of the peritoneum were retracted, and a portion of intestine was in contact with the wound, the impress of which was obvious on the surface of the gut. Some coagula of blood and an abundant consistent lymph exudation upon the peritoneal surface of the intestine corresponded with the edges of the incision and the surface of the wound. Recent lymph glued the opposing surfaces of the intestines to each other. I saw at once how much better it might have been if the peritoneal edges had been brought accurately together, and thought of doing this in my next case. But I found instructions in text-books and treatises carefully to avoid the peritoneum. These doctrines were at variance with the facts before my eyes. Physiological principles had been overlooked. I did not question them, but now that an important practical question was raised which bore distinctly upon the failure of my operation, I determined to put them to the test. I made experiments upon animals for which I have been vilified, but for which I do not reproach myself. The preparations which I procured from these creatures are still preserved in the Museum of the Royal College of Surgeons.

They corroborate what was known before, that abdominal wounds well adjusted unite readily. This was not what I wanted. They proved more, and were the visible, standing evidence which I did want, that though the other tissues might be brought together, if the cut edges of the peritoneum were left free, they retracted, direct union did not take place, and secondary evil consequences resulted. In the specimen where the divided edges or rather surfaces of peritoneum have been pressed together, the smooth serous inner coat of the abdominal wall is perfectly restored. The stitches on the inside cannot be seen though plainly visible on the skin, and there is no adhesion of intestine or omentum. But in other specimens, where the peritoneal edges were purposely excluded from the sutures, and the animal was not killed for a day or two, intestine or omentum adheres to the inner surface of the abdominal wall, thus completing the peritoneal sac at the great risk of intestinal obstruction, to say nothing of a want of firm union and subsequent ventral hernia. Without this convincing demonstration in my hands, I might have gone on for years bowing to precepts and oblivious of principles, sometimes taking up the peritoneum and sometimes leaving it loose, with perplexity to myself and danger to my patients. But my lesson was learnt, and I cannot too strongly inculcate it upon others. When skin or mucous membrane are divided, their edges must be brought together to secure direct union. If they be inverted, union is prevented. The exact opposite holds good with serous membranes. The edges should be inverted, and two surfaces of membrane pressed together, so that the sutures are not seen; and the effused lymph makes so smooth a surface that even the line of union cannot be seen. This appeared to be good and promising work for 1859, and I felt that I was announcing what was indisputably true, but, as often happens at first, the fruits did not equal my expectations, for I had the misfortune to lose five cases out of the eleven which I did during the year, three in hospital and two in private practice.

The translation in 1860 of Kiwisch's Chapters on Diseases of the Ovaries by Clay, of Birmingham, with the very valuable tables appended to the work, must be regarded as greatly assisting in the progress of ovariotomy in this country. Mr. Baker Brown's success with the cautery, Dr. Tyler Smith's

revival of the practice of returning the pedicle with the ligature around it, and the numerous published cases of Hutchinson, Bryant, Murray, and other surgeons, have all had their share in the general result.

Within the next five years I completed my hundred and fourteen operations, and at the end of them in 1864 published my first book, which was a record of all the cases with commentaries, such as the experience acquired in conducting them and the discussions of the day seemed to make it a duty to lay before the public. On taking up this subject as a matter of study and trial, just at the crisis when obloquy was the thickest and opposition the strongest, I felt that, in securing the progress which I hoped to make, nothing but the most open frankness would carry conviction of my success, or in case of failure justify the attempt. I was not unconscious of the fact that however much I might devote myself to it as a professional obligation, and as a response to a despairing cry from a crowd of hopeless women, it was looked upon as a Quixotic surgical enterprise which had baffled others, and from which many had withdrawn discomfited. I therefore pledged myself to make known through the press all that I did and all that befel me, and my book was the formal redemption of that pledge, gathering up as it did all the isolated details of my practice, and the scattered remarks published from time to time in the journals. During this period of five years, and in treating the long series of cases as it then seemed, nearly all the questions of practical importance and speculative interest came up for consideration, and were rendered intensely pertinent from the urgency of their actual application. Up to the time of my beginning to operate, there was but little concord among my predecessors as to the mode of doing the operation, and scarcely any reference to scientific principles in choosing this or that course. Ignorance of anæsthetics had long kept so formidable a proceeding out of the hands of all but the most daring of surgeons, and out of the thoughts of any but the most desperate of patients. But now, in the calmness of ether and chloroform, and with the possibilities of the older surgeons reduced to demonstrated facts, attention began to be concentrated upon details and accidents. Problems of diagnosis, the means, as Hunter expressed it, 'of knowing beforehand that the circumstances would admit of

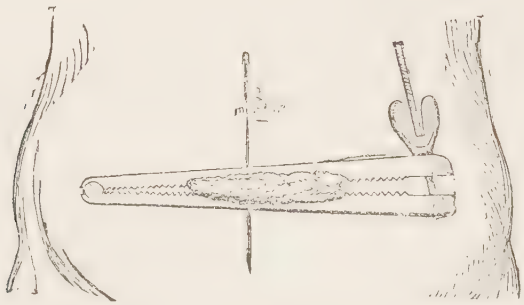
such treatment,' the relative safety of long or short incisions, the mode of dealing with the pedicle, the tolerance of the peritoneum, the best way of closing the wound, the value of opium in connection with the operation, the temperature and regimen to be observed, the distinction between peritonitis and reaction, the nature and cause of septicæmia, and the after consequences of the operation; all these and other subjects, affecting, by the way in which they might be decided, the results of ovariotomy, were presenting themselves to the practitioner and demanding his judgment. It would have been absurd on my part to pretend that I was arriving at absolute truth, or to enunciate anything like unquestionable maxims. But as facts accumulated, as I became familiarized with difficulties, aware of sources of danger, and learnt, either by trial or from others, better modes of procedure, I formed opinions, acted upon them, and offered them for criticism. Some stand their ground, others have had the common lot of fallacies; but true or false, they were adopted according to the light of the day, and I cannot be responsible for not finding out the whole truth, or not seeing better than others in the same darkness. I have often regretted that I failed to become sooner acquainted with the valuable clinical lecture of Mr. Cæsar Hawkins, which would have cleared my way through some difficulties, and dissipated some shadows which perplexed me. But on reference to my volume of 1864, it will be seen that I soon came to the conclusion that it was a matter of no insuperable difficulty to decide upon the practicability of the operation, and that an exploratory incision was a justifiable, sometimes useful, and almost always a harmless proceeding. When Keith can tell us that only twice out of his many cases has he been deceived as to the nature of his tumours, even the shade of William Hunter must be appeased. With regard to the incision, it wanted no magician to demonstrate that length was a relative quantity, that it would be as stupid to make a cut ten inches long for the extraction of a tumour the size of a cricket-ball, as it would be madness to try to drag a semi-solid multilocular mass through Dr. Jeaffreson's minimum opening, and I therefore acted upon the rule of giving myself room according to my case.

But, as will be seen by my table of incisions, I have always

tried to keep as near the safe medium length as possible, and it would sometimes happen that such an opening was too small for a big multilocular tumour to be dragged through as it was. The trocar did very little more than if it had been stuck into a sponge. There are, however, more ways than one out of a difficulty if you only look at it calmly. In such a case of disproportion between cut and bulk, I soon began to take the simple alternative of breaking down the interior of the tumour with my hand, till the antagonism was adjusted, and thus gained another point in rendering the operation easier, and ensuring its completion in many cases which would formerly have been abandoned.

As to the pedicle there was more hesitation. No one knew exactly what should be done. I tied it and kept the ligatures out through the wound, as others had advised. I tied it and let it drop into the abdomen. I fixed it in the wound with a ligature and pins. I secured it outside the wound with a clamp. I cauterised it and left it *in situ*. I combined the cautery and ligature. I made a solitary essay with the écraseur, and I conjoined and modified most of these procedures. Every plan had its special difficulties and dangers, and one peculiarity of all this tentative work was, that it brought the disadvantages more conspicuously into view than the advantages. It is impossible now, with the results of the experience of twenty years tabulated and criticized, and practice running in two or three equally approved grooves, for any one to form an idea of the perplexity which formerly made every movement in advance dubious. Circumstances sometimes took away the ground of option, as when the pedicle was too short to be brought out of the wound and clamped. But upon the whole, in accordance with what was the then belief, that a tied pedicle, whether enclosed or left to drain through an aperture, must undergo the process of gangrene and sloughing, the notion of extra-peritoneal treatment was theoretically right, and it was this conviction, together with some practical objections to the ligature and cautery, that led me to give the preference to fixation externally by the clamp. The greater part of the pedicles during this section of my operative work were treated in this way. There were no statistics to judge by, but I seemed to be doing better with it; and later on, when numbers augmented, they proved that the

mortality in these cases was less than the general average, and vastly lower than that given by the ligature. It is true that the cases I did with the cautery turned out well, but they were few in number; and though Baker Brown was concurrently doing better still with it, I was not assured of the fact at the time. Besides, it is not in the nature of things that one man can guarantee himself the same success as another in adopting his practice, especially when that practice is a matter of manipulation. And further, I must admit such a want of confidence in the efficacy of the cautery as would have morally incapacitated me from continuing the operation by such means. Whether right or wrong then, the clamp gained its ascendency and I continued to use it. It has since been imputed to me that by so doing I retarded the progress of ovariotomy, that I deterred others from venturing upon an operation involving so

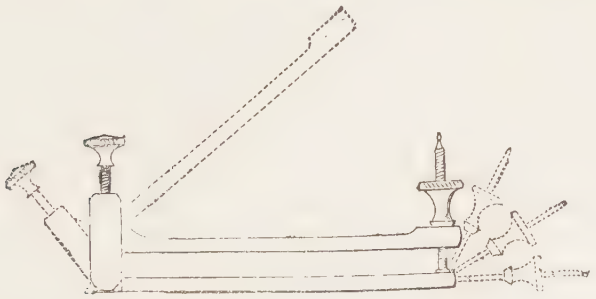


fearful a mortality as that of one in four or five. But it is easy to make such reflections retrospectively, and I can only retort that without the leading of the clamp and the support which the clamp results gave to the trial of other surgical expedients, some of those who are the successful ovariotomists of to-day would never have been ovariotomists at all.

The primitive clamp was nothing more than the carpenter's callipers, but they were clumsy and inconvenient. Mr. Hutchinson introduced them, and his first improvement was to make the handles movable. To them succeeded a variety of ingenious arrangements of bars and rings made with a view to equalise the pressure, and to render the escape of tissue impossible. Some were parallel, others circular, some were too ponderous, others too slight.

The drawing on preceding page was published in 1858. It shows the first attempt at a parallel clamp before I added a screw at each end, and it shows very well how a pedicle not subjected to circular constriction would be so elongated from side to side as to prevent closure of the wound.

My first attempt to improve upon this instrument resulted in the manufacture of two fenestrated blades, which were made to exert parallel compression by a screw at each end. This instrument is still described as my clamp, and the original sketch of it here given has been copied by Simpson and other writers. It forms the basis of the clamps known as Dawson's and Atlee's, both of which have been successfully used in America. They appear to me, however, to be too slight in construction; and I very much prefer my own simpler form of the instrument, even although it may be necessary to compress



some of the wide, uneven, and expanding pedicles before finally fixing the clamp.

Atlee afterwards added holes for pins, by which the pedicle can be compressed, or prevented from extending laterally, as the clamp is tightened. I had tried to attain the same end by carrying a ligature through the fenestræ of the blades, and making circular compression upon the pedicle while the screws were bringing the blades together. Without some precaution of this kind, the pedicle is so expanded that it becomes a serious impediment to entire closure of the wound; and if one part of the pedicle is thicker than another, the thicker part interferes with the complete compression of the thinner, which is then apt to slip.

After using this instrument for some months I found it less

easy of application than the modified calliper clamp, and I made some improvements in the latter, trying three different forms of movable connecting joint, different forms of the compressing surfaces, from the perfectly smooth and flat to grooves and ridges falling one into the other, or a convex surface received into a concave, or one where a projection in the centre was received into a corresponding hollow; and I found the most trustworthy was that suggested by Küchenmeister, of Dresden, where oblique ridge and furrow on one blade exactly meet the corresponding elevations and depressions on the other. If properly made, these surfaces, when pressed together, will not allow a piece of fine tissue paper to be drawn between them. The smooth arc not affording a sufficient hold upon the screw, the upper surface of the arc was roughened. The straight instrument lying awkwardly after application, and sometimes causing painful pressure at its angles, I had it curved and all the edges carefully rounded off. Various modes of fixing movable handles were tried, and none proving very satisfactory, I substituted a large pair of forceps for the handles, so made that it would fit clamps of all sizes, and one pair of forceps serve for any number of clamps. Additional thickness was given to that part of the blade in which the screw passes through to the arc. When well made this instrument holds very securely in most cases where a clamp can be applied, but occasionally the auxiliary aid of a ligature is necessary; for instance, if the pedicle be made up partly by the thickened Fallopian tube or utero-ovarian ligament, and partly by thin membranous expansions of the broad ligament running towards the colon or cæcum, the clamp alone is not trustworthy. The thin part of the pedicle is not compressed because the thicker parts of the pedicle keep the blades too far apart; and after the cyst is cut away, the thin portion of the pedicle is very apt to slip inwards. I have seen very troublesome bleeding arise in this way, which might easily have been prevented if the circular compression of a ligature had been exerted before the application of a clamp. I attempted to make a circular clamp, and different makers tried to carry out my wishes, but the only promise of success was from one made for me by Meyer. After occasionally using this instrument I found that it would cut through some varieties of pedicle just like scissors. I had

more than once to suppress troublesome bleeding, so that after a short trial of this clamp I returned to the use of the calliper clamp, with the modifications which I have described. The mode of applying the clamp will be shown when the various plans of dealing with the pedicle are considered in the chapter on the operation.

It will be seen that the idea did not change, and that the alterations of the joints, screws, curves and surfaces were made for convenience, and what was known in England as my clamp very well answered its purpose as long as it was wanted to carry out the extra-peritoneal treatment.

This idea of extra-peritoneal treatment, as I have said, had more to do with the fear of shutting up noxious putrefactive matter coming from the strangulated pedicle than anything else. But, as well, we all at that time looked at the peritoneum with a kind of reverential fear, and were always under the apprehension of its resenting any neglect or interference by some itic action. No one had any clear notion of its tolerance of everything that was not in its nature harmful. Men who had cut it open, torn through adhesions on its surface, and left it exposed for perhaps half an hour while they were liberating a tumour, were as anxious to shut it up hermetically as soon as they had finished as if they knew it to be hydrophobic or aerophobic. I was not far behind the ruling opinions, and if any one had asked me why I united the wound so closely round the pedicle, they would have found their answer in these words in my book, 'The fear is that peritonitis may be set up by leaving *any* opening.' It was a curious instance of inconsistency, because in the very same page I advocate a free opening for the exit of serum if any there should be. It was a remnant of antique superstition, and we had not yet fully learnt to estimate the eclecticism of the peritoneum. We soon, however, found out that while a very little fluid which had no business to be there irritated as much as a sponge, we might profitably reopen, wash, cleanse and drain. The step from this to making a free passage through the vaginal wall was not difficult, and this I did in my thirty-sixth case, thereby saving the life of the patient. Afterwards I had only to regret sometimes not having done it with sufficient boldness. But the process which came to be called the toilette of the peritoneum, both

primary and secondary, soon made progress, and is now not the least efficient factor of the general success of the operation.

Some of the surgeons who had operated before me, placed the patient in a sitting posture near the edge of the bed, with her legs widely separated, her feet supported on stools, and her back and head resting on pillows; and a few do so still. I followed this practice in my first three cases, but it was so difficult to keep the patient properly covered, she was so

much difficulty in preventing the escape of the intestines, and in completing satisfactorily the various steps of the operation, that I tried the recumbent position in my fourth case, and I have kept to it ever since.

In Simpson's 'Lectures on Ovariotomy,' published in the 'Medical Times and Gazette,' and reprinted in his collected works, this drawing which I prepared for him was introduced to show the couch on which I performed a great many of my earlier operations. It was very convenient, but it became troublesome to carry such a piece of furniture about from

house to house. Two common dressing-tables, which may be found wherever we go, placed T fashion, soon commended themselves as equally fit for the purpose, and have served me ever since. The recumbent position is incontestably safer for the patient as well as more agreeable to the surgeon, and I believe it is partly owing to my adherence to it that through all my operations I have never had any serious trouble from fainting and collapse, and have been saved the misery of seeing a woman die on the table.

As with my experiments on animals so with my patients, I began closing the wound with hare-lip pins, passing them through the whole thickness of the abdominal wall at intervals of an inch. Each pin perforated the skin about an inch, and the peritoneum about half an inch from the incision on either side, so that when the two opposed surfaces were pressed together upon the pin, the two layers of peritoneum were in contact with each other. But I soon began to use and prefer sutures to pins, and tried different materials for this purpose. Metallic sutures were then coming into vogue, and in 1861 I was trying silver. In 1862 I used platinum sutures for my thirty-sixth case, to ascertain if any advantage would arise from the use of a metal which would not oxidize like silver or iron, and remembering the use of platinum sutures twenty years before by Mr. Morgan at Guy's Hospital. But I have scarcely ever seen so much suppuration in the track of the sutures as in this case; and it taught me to look to the size of the needle, the size and smoothness of the thread or silk, the tightness with which it is tied, and the time it is left, as having more to do with suppuration or sloughing than the material of which the suture is composed.

A little later in October of the same year, wishing to observe any difference between silk and metallic sutures, I passed four deep sutures, one of silk, one of iron wire, one of silver wire, and one gilded hare-lip pin. I removed them all forty-eight hours after operation, and found the wound equally well united throughout. The silk suture was removed with least pain to the patient, the silver wire next, and the iron wire, being harder, caused most pain in removal. In other operations I had tried horsehair and the fine catgut used for guitar strings, but I was coming to the conclusion that nothing answered so

well for sutures on the whole as good silk well twisted. Subsequent trials of silkwormgut, catgut, tendon, and telegraph wire coated with gutta-percha, have all confirmed me in my impression as to the superiority of silk if tied tightly enough to bring the edges of the wound together accurately, yet not so tight as to strangulate the intervening tissues. It need never be removed before the seventh day, and may be left till the ninth or tenth, if so desired, without any harm. My impressions and conclusions of 1862 remain my convictions in 1882; and the fact that I have uniformly used only silk for my ligatures and sutures all through the several stages of my gradually improving results, shows what I said in the beginning to be true, that the material is of less importance than the way of managing it. It was not long after my changing the pins for sutures in fixing together the edges of the wound that, finding there was a chance of suppuration from their being left too long, and wishing to ascertain how soon they could be removed with safety, I adopted the plan of supporting the abdominal wall with long straps of adhesive plaster, and I still continue to use them and a simple flannel bandage.

In looking over the notes of the period about which I am now writing, it is curious to mark the vagueness of all our notions as to the import of certain symptoms and conditions. Even such a point as the difference between reaction and peritonitis was not clear to every one. My fortieth patient was a very young woman, who, in two years' time, had been modelled by her disease into the most perfect type of an ovarian martyr, and who rebounded into health with a rapidity and persistence absolutely marvellous when once relieved from her oppression.

'At first the sudden removal of such a strain seemed to be almost too much for the system; it seemed as if it were difficult for heart and lungs to play with even balance under so much lighter a task—the pulse was a little hurried, the face flushed, the skin rather hot. But soon we had a free perspiration, and all went well. Just at this time I was a little amused by the different views taken of the case by two worthy friends of mine. Each observed the same symptoms, but interpreted them very differently. One, more at home in the dissecting-room and the dead-house than at the bedside, began to speak ominously of peritonitis, to suggest leeches and calomel

and opium, and seemed surprised at my being content to let what I thought well alone. My other friend, whose life had been passed in watching and treating disease—not merely in examining and collecting the fragments of the wreck after the storm has left it shattered on the shore, but in noting the warnings of the coming tempest, and in learning how to trim sail, to bear up or to lay to, and what course to steer to reach a safe anchorage—this true pathologist saw nothing to alarm him in the quickened pulse, the warm skin, or the flushed face; he looked quite delighted, and exclaimed, "What nice reaction!" He exactly expressed my own thoughts, and two small opiates given during the night after the operation to quiet pain, were the only medicines of any kind which this patient took during her convalescence.'

Nor has her subsequent career belied the good augury of her vigorous recovery. She married and bore children, has buried three husbands, and is now in 1882 a promising widow of less than forty years of age.

I have more than once had occasion to refer to my fourth case, and I turn to it again because there is often more practical good to be gained by sifting the details or dwelling on the history of one unfortunate event than by skimming over a sea of statistics, or ballooning through a cloud of speculation. I have said that I did not know why my patient died, and at the time that was quite true. In the published table of cases the cause of death was set down as septicæmia. This was an after thought. For what, in truth, did any of us know about septicæmia in 1859? One may judge how little it was by the way in which I expressed myself in a paper read before the Medical and Chirurgical Society the month after I had operated.

I was asking the meeting to endeavour to help me in estimating the share which each of four agencies that I suggested had in causing the death. I had my doubts about the opium she had taken, for just then it was the custom to use it very freely. I suspected bleeding from the pedicle, at the moment of removing the tumour, might have done mischief. And I was not disinclined to fortify myself against self-reproach by calling to mind the collapse which Simpson had so well described as an accident peculiarly liable to occur after operations about the

pelvic organs, and for which no sufficient explanation has been offered. But I emphatically asked, 'Did she die from peritonitis?' adding, 'Some who consider the amount of lymph effused, and the quantity of serum found in the peritoneal cavity, would answer this question unhesitatingly in the affirmative. But I doubt if simple peritonitis was sufficient to cause such sudden collapse. It was partial, confined to the visceral layer opposed to the wounded surface only, not dipping down among the coats of intestine. My impression is, that if peritonitis killed her, it was indirectly, by the formation of a morbid poison. The serum was very acrid, it made Dr. Aitken's hands smart for some time; had he wounded himself, in all probability he would have suffered from morbid poisoning. Had he attended a woman in labour, in all probability that woman would have had puerperal peritonitis. If, then, my patient could generate a poison capable of killing other people, may it not have killed her? It was probably formed only from the inflamed portion of the peritoneum, the other portion being quite capable of absorbing rapidly.' Here then was the idea of poison superadded to that of peritonitis; but the patient was blamed for making it herself, and perhaps fairly, as she had suffered from an eruption of herpes on one side of the chest only a few days before. But nothing was as yet said about the likelihood of its having been brought to her. Two years later I had personal proof of what this poison could do. I pricked myself in examining the body of a patient who died under similar circumstances, and I was ill enough to make me say in writing the report of the case: 'A poison which affected me so severely in a small dose might easily kill any one in a larger dose. I recovered after the absorption of a fraction of a drop; but the poor woman was overpowered by the quantity taken up by her own absorbents.' Here again one part of the peritoneum was accused of distilling and another part of absorbing the venomous fluid. Now I thought I had learnt a grand practical lesson, which I reiterated in all that I wrote, that our business was to let out this fluid as soon as we saw signs of its collecting in the peritoneal cavity, either by opening the wound or tapping by the vagina, or any other means by which we could give it exit. This policy of ejectment was very well so far as it went, and without question some lives were saved by it. But

it was working at the wrong end of the problem. Still the missing link in the ratiocination of this subject was close at hand. A parturient woman fulfilling one of the natural functions of life could not, except under the most abominable conditions, be looked upon as a focus of self-engendering poison. Yet she was occasionally overtaken by puerperal peritonitis, and the cry immediately was, 'Where did it come from?' Importation was the accepted explanation, and accoucheurs fell into the category of 'suspected persons.' I had now the clue in my hand, and in less than a year it led me to an understanding of my difficulties. Two cases, my seventy-fourth and seventy-fifth, proved fatal, and the surroundings were more than suspicious. This led to the exclusion of all midwifery practitioners from my operations unless they could present a clean bill of health, and subsequently to the declaration, so much quizzed, which was obligatory upon every person wishing to see my hospital cases. Then followed other precautions, and I was to be seen using carbolic acid and the hyposulphites in my ovariotomy wards.

The famous asseveration and prophecy of Sir James Paget before one of the meetings of the British Medical Association, 'that some of the deaths after surgical operations were preventable, and that the mortality *will* be reduced if the members of the association will decide that it *shall* be,' was not without its influence. At the Cambridge meeting in 1864, I treated of hospital atmosphere, organic germs as causes of excessive mortality, and commented on the researches of Polli with sulphur and the sulphites. Here then were theory and practice brought into accord, and my quarantine, drainage, vaginal tappings, and chemical remedies may justly be scheduled as the concrete form of antisepsis which has since become volatilized into the germicidal spray of Lister.

The progress of ovariotomy in England has thus been brought to the issue of my first book at the end of the year 1864. It does not profess to trace the general progress of the operation, or to estimate the value of other modes of treatment adopted by the various surgeons who were, like myself, making their experience. But as a simple record of what I did, of the oscillating opinions on many points of practice, of the way in which light partially dawned upon some of the obscurities of

the subject, of the anxious unravelling of some of the mixed threads of logic and experiment which led to definite lines of action, of the discussions, consultations, and workings with a great number of estimable and accomplished men, many of whom have remained friends, and become successful co-operators, it has, I believe, been useful. I was not prepared to write a systematic treatise, I was not in a position to dogmatise, but I had tided over initial obstacles; and though I could not expect unvarying success, I had done enough to put down opposition, and to demonstrate the fact that I was following a legitimate course, and had reason to hope better things for the future. Whatever else the book may be, and however little I may be disposed to claim for it a place as a piece of surgical literature, it has the value of truthfulness; and as none of my cases have since been so fully described, it even now serves me as a wreck-chart and a guide.

During the seven years and a half which succeeded, I completed five hundred cases of ovariotomy, and in the autumn of 1872 published my book on ovarian disease. It was not like the first, a case-book, but contained a general summary of all that I had learnt upon the subject, and with regard to the operation, the fullest practical and statistical information at my command. I had all through carried out my scheme of periodically reporting progress. Yet I felt that the profession had a right to something more in the way of recapitulation of facts, and summing up of the results of so much work either in the way of operative improvement or pathological science. I am now responding to the call for a second edition, and that is enough for me to say about it. I still continued to do the surgical work of the hospital, having been all through assisted by a succession of younger colleagues, among whom I may mention especially Dr. Charles Ritchie, Dr. Junker, and Dr. W. Thomson. The promising career of Ritchie, to my great regret, was cut short by a melancholy accident, and both Junker and Thomson have seized opportunities of distinguishing themselves otherwise than as ovariotomists. It was during this time that Dr. Richardson brought to my notice his investigations of the value of methylene as an anæsthetic, and the apparatus which Junker invented for its convenient administration has been in use ever since. Chloroform had been given

from the first with the exception of a few trials of ether and other combinations, but it was quite supplanted by methylene. I may also congratulate myself, and my patients too, that for several years past this valuable remedy has been administered by my friend, Dr. Day, with so much care and judgment, that we have been spared all anxiety and danger, and most of the annoyances which so often attend the employment of other anæsthetics.

The work of ovariotomy was now becoming a matter of routine. Series of hundreds succeeded to series of hundreds, and happily with regularly diminishing losses. Instruments were sometimes new-modelled, and there were modifications of manipulative details and after-treatment, but we were now acting upon principles which kept us pretty nearly in a given course, and made the service of the sick room comparatively easy. Dr. Bantock and Mr. Thornton were installed as joint surgeons with me in hospital, and not only took a part in my operations, but commenced their own work as ovariotomists in 1875 or 1876. They had every opportunity of observing my practice, and of forming their opinions as to the expediency of following it implicitly, or of making up an eclectic code of their own by culling the fruits of other men's experience; but I can conscientiously say that I acted towards them and others in the spirit of a remark which I found in one of the reviews of my book, that a man in my position 'has no more right to die with the hoarded endowments of his life unrevealed than he has to commit suicide.'

The incident of Mr. Lister's arrival in London in the year 1877 raised the question of the applicability of his system to ovariotomy. The mortality from my own hospital operations being at this time not much more than 9 per cent., I hesitated about venturing upon any untried proceedings which might interfere with results then so satisfactory. But Mr. Thornton, who had been an enthusiastic pupil of Lister, introduced his mode of operating and dressing in all its integrity at the Samaritan, and Dr. Bantock for a time followed his example. Some other novelties, such as Dr. Bantock's non-alcoholic after-treatment and Mr. Thornton's ice-cap a little diversified the routine of our wards.

After twenty years' service as operating surgeon to the

Samaritan Hospital I felt myself not only warranted in retiring, but bound to make way for my junior colleagues, and at the end of the year 1877 placed my resignation in the hands of the committee. At their request, however, I retained the post of consulting surgeon. My last ovariotomy as surgeon to the hospital was done on December 12, and after it I made a few remarks to those present, giving a summary of my work in reference to these cases. They were published in the 'Medical Gazette,' and the following table showed the distribution of my operations over these twenty years :—

Years	Cases	Recoveries	Deaths
1858	3	3	0
1859	6	4	2
1860	2	1	1
1861	6	3	3
1862	13	10	3
1863	16	11	5
1864	14	11	3
1865	17	13	4
1866	15	10	5
1867	21	17	4
1868	32	25	7
1869	21	14	7
1870	24	17	7
1871	26	18	8
1872	30	23	7
1873	34	25	9
1874	29	20	9
1875	28	20	8
1876	42	38	4
1877	29	26	3
Total	408	309	99

I then went on to say : 'Now let us see how far increasing experience has affected the proportion between recoveries and deaths in successive years. A glance at the table will show you how this varies in the several years ; but we want larger numbers for anything like accurate statistical conclusions. This, we may, perhaps, gain by grouping the cases together in series of five years. I have done this, and here is the result :—

Series of Years	Cases	Recoveries	Deaths
First five years . .	30	21	9
Second five years. .	83	62	21
Third five years . .	133	97	36
Fourth five years. .	162	129	33

If we take the last two years only (1876 and 1877), we find 71 cases, with 64 recoveries and only 7 deaths—a mortality just below 10 per cent.

'Or putting these facts in another form, and dividing the twenty years into four successive periods of five years each, it appears that in the—

First five years	about	1 in	3 died
Second and third five years . .	„	1 „	4 „
Fourth five years	„	1 „	5 „
Last two years	„	1 „	10 „

'But, to render the matter more clear, I arrange these cases in another table, which gives us at once the number of cases, the number of deaths, and the percentage of recoveries:—

Series of years	Cases	Deaths	Recoveries
First five years (1858 to 1862)	30	9	70 per cent.
Second five years (1863 to 1867)	83	21	74 „
Third five years (1868 to 1872)	133	36	73 „
Fourth five years (1873 to 1877)	162	33	80 „
Total	408	99	
Two last years (1876 and 1877)	71	7	90 „

'A moment's consideration of these facts—indeed, I think the question may be considered as settled—will carry the conviction that increasing experience has been accompanied by diminishing mortality.

'In speaking of ovariotomy in this hospital, and in preparing the preceding tables, I have dealt with my own work alone. For many years, with an occasional rare exception, I did all these operations. And in connection with the evidently increased success attending them, it is interesting, just for a moment, to look back over the many hesitating steps by which we have advanced in gaining confidence in our diagnosis, facility in the purely operative proceedings, and the means of meeting many of the early difficulties of after-treatment.

'And now, appearing here for the last time as the surgeon of the hospital, I am glad to say that neither my colleagues nor the governing body of the institution wish that my new position as consulting surgeon should be purely honorary.

'If in some such manner as this I had not been able to keep

up my interest in the work of this hospital, I might have been induced to perform the duty of surgeon for some years longer, but a long while ago I was deeply impressed by some remarks made by Sir Benjamin Brodie on his retirement from St. George's Hospital, after eighteen years' service as surgeon. I forget the exact words, but he has reprinted something very like them in the conclusion to his Autobiography. He says—"It was not without a painful effort that I made up my mind to resign an office to which I had been sincerely attached. In doing so I was influenced by various considerations. One of them was that I began to feel the necessity of diminishing the amount of my labours. Then I had long since formed the resolution that I would not have it said of myself, as I had heard it said of others, that I retained a situation of such importance and responsibility when, either from age or from indifference, I had ceased to be fully equal to the duties belonging to it; and lastly, when I saw intelligent and diligent and otherwise deserving young men around me, waiting their turn to succeed to the hospital appointments, it seemed to me that there was something selfish in standing longer in their way, when, as far as my own mere worldly interests were concerned, I had obtained all that I could desire."

'When I first heard these sentiments of Sir Benjamin Brodie I determined that if I should ever be placed in any like position I would do my best to follow the example set by so wise and good a man; and in carrying out that determination now, I trust that while I am thus enabled to devote more time and attention to my private practice, I shall still be of some use to the suffering women in the hospital without standing in the way of ambitious and deserving juniors, who have worked long and hard for the position they have now attained, and which I sincerely hope they may enjoy for many years to come.'

The next table of ovariotomies fully justifies the course that I took, and makes it clear that as yet the patients have no reason to regret the change. It gives the results of my immediate successors, Bantock and Thornton, for the four years after my retirement. Latterly our junior colleague Meredith has begun his career as an ovariotomist by a series of nine cases, all successful. Both he and Thornton invariably operate antiseptically, and, without drawing any deductions, it is only right

to state that their contribution to the mortality average of the year 1881 is very small, the deaths after their fifty operations being only two.

Year	Cases	Recoveries	Deaths	Mortality per cent.
1878	76	61	15	19·73
1879	86	76	10	11·62
1880	94	85	9	9·57
1881	84	75	9	10·7
	340	297	43	13

The four years from 1878 to 1881 have been memorable to me for two reasons, that during them I completed, and now more than completed, a thousand cases of ovariotomy; and that I have taken up the antiseptic system adopted elsewhere, so as to judge by my own experience, not of its general scientific claims, but of the utility of the Lister spray and dressings in abdominal surgery.

My exclusively private practice began with the 888th case, and in the month of June 1880 the number of 1,000 cases was made good. The table which I annex notes in detail the times in which the several series of hundreds were accumulated and other matters connected with them which have a statistical interest.

Dates of completion of the successive hundreds of Ovariotomy Operations from 1858 *to* 1880 :—

No.	Dates	Recoveries	Deaths	Cases
1	From Feb. 1858 to June 1864	66	34	100
2	„ June 1864 „ Mar. 1867	72	28	100
3	„ Mar. 1867 „ Jan. 1869	77	23	100
4	„ Jan. 1869 „ Dec. 1870	78	22	100
5	„ Dec. 1870 „ June 1872	80	20	100
6	„ June 1872 „ Jan. 1874	71	29	100
7	„ Jan. 1874 „ April 1875	76	24	100
8	„ April 1875 „ Oct. 1876	76	24	100
9	„ Oct. 1876 „ June 1878	83	17	100
10	„ June 1878 „ June 1880	89	11	100
		768	232	1000

General Mortality, 23·2 per cent.; largest 34, smallest 11.
The whole time occupied wa 22 years and five months.

I have since up to the date of writing added sixty cases with a loss of four patients, of whom one died of scarlet fever, eight days after operation, two maniacal, in part due to inveterate alcoholism, and the fourth from primary hæmorrhage and shock.

The number of my private ovariotomy cases then since 1877 in the four years tells up at the time of writing to 173, and among them there were sixteen which ended fatally, giving a mortality of 9·2 per cent., curiously corresponding with that of my latter hospital work.

Before touching upon the question of what influence the so-called 'antiseptic precautions' or details of the Listerian method have had upon my practice, I will explain precisely what the additions or changes have been, and what modifications of treatment it has induced me to make.

Long before Mr. Lister had tried any of his methods, indeed from the very beginning of my practice of ovariotomy, I had insisted upon all possible care in protecting patients before, during, and after operation from all the known causes of excessive mortality, and I took unusual precautions against any risk of contagious or infectious disease being communicated to a patient, and against the entrance from without, or the development from within, of anything which could set up traumatic fever or blood-poisoning. I contended that obstetrics and operative gynæcology should seldom be permitted in the same building, or by the same surgeon in private practice; and that such an operation as ovariotomy should never be performed where patients with uterine cancer, or offensive discharges of any kind, may pollute the place. In 1875, a separate branch of the Samaritan Hospital was opened, and since that year the surgical wards have been much freer from such sources of danger. The good effects of this change were noted before other antiseptic measures were insisted on. And cleansing or purification of the ward or room, of everything about the operating table and bedding, of the patient herself and the parts near the seat of operation, of the surgeon, assistants, and nurses, and of all the instruments, sponges, and water used, had gradually become more complete before carbolic acid was used, or any antiseptic precaution added to those adopted before 1878.

As the material for tying vessels and uniting the wound, the same pure twisted silk, unmixed with any vegetable fibre, which I have trusted to for about twenty years has been used. I have hardly ever tried catgut; and after trial, have abandoned whipcord, hempen ligatures, silver, iron and platinum wire, horsehair and other materials. Various forms of quilled and twisted sutures have also been tried and abandoned. But since 1878, all the silk for ligatures and sutures has been soaked before use in a 5 per cent. solution of carbolic acid or phenol. I have not boiled the silk, as Billroth and others have done.

Dry dressing of the wound has been continued; but in place of the pads formerly used, of 5 per cent. of oil of tar with 95 per cent. of chalk, either thymol or iodoform gauze, or cotton pads charged with borax or phenol, have been used. These are more comfortable to the patient, and are better absorbents of moisture. As a rule, they are not touched before the seventh or eighth day, when the sutures are removed, and the wound is almost invariably found to be completely united.

The two most important additions to previous antiseptic precautions are, first, carbolising the sponges and instruments, and secondly, the use of the spray. I had long insisted on the great importance of always using perfectly pure sponges, and I believe this object is more perfectly attained by soaking them in a carbolised solution after washing, than by washing alone.

After an operation, I continue my old plan of keeping the cleansed sponges in a weak solution of sulphurous acid. And during the operation, in addition to washing in pure water, every sponge before use is wetted with a 2 to 3 per cent. solution of carbolic acid or absolute phenol. Soft, clean linen cloths, wetted with a warm solution of phenol, may be used to lessen the number of sponges required; and nurses must be cautioned not to put any of the soiled sponges into the solution until after they have been washed, otherwise albumen may be so coagulated as to prevent thorough cleansing. As nurses often fall into this error, it is well to have two or three different sets of sponges, all carefully numbered, kept separate for the successive steps of the operation.

Nearly all the instruments used in ovariotomy may be protected from rust by a coating of nickel. They are then more easily and thoroughly cleaned after use, and the cleaned instru-

ments should be placed before, and replaced during, the operation in trays or dishes filled with a warm solution of phenol.

These additional precautions as to sponges, silk, and instruments, I believe to be really important. I feel still doubtful about the spray. 'Striving to better, oft we mar what's well.' In prolonged operations, I have had reason to fear that its chilling effect upon the patients has been injurious. But I have never once seen any other ill effect which I could attribute to it, nor anything like carbolic poisoning. The misty cloud occasionally obscures the field of operation, but not to any serious extent, and it is always easy to protect the peritoneal cavity against the continued action of the spray by a large warm sponge. After a few trials I gave up thymol spray as useless, and for more than a year past have used a spray of absolute phenol of a strength of one in forty. And this I continue to use, believing it to be safer than the irrigation or sponging proposed as substitutes, although I fully admit that we require a far greater number of trustworthy experiments, or of comparative observations made under similar conditions with and without spray than have yet been made known, before we can receive any satisfactory answer to the questions whether carbolised vapour or air can destroy or render innocuous, infective or putrefactive substances or germs floating in the air; or what is the share which the spray, among other additional antiseptic precautions, has had in obtaining the better results which have undoubtedly accompanied their combined employment.

On carefully going over the notes of all the cases to ascertain if the smaller mortality in those treated antiseptically could be due to any other cause, the only modification in the mode of operation which calls for further remark is the very much more frequent, almost constant, employment of the *intra*-peritoneal treatment of the pedicle since the trial of the antiseptic system was begun. Before that time, the extra-peritoneal treatment had been by far the more successful in my practice. When comparing the results of the two methods at the College of Surgeons in June 1878, I showed that of 627 *extra*-peritoneal cases, 130 had died, or 20·73 per cent., while of 157 *intra*-peritoneal cases, 60 died, or 38·2 per cent., the mortality with the ligature having been nearly double that with the clamp. I am quite sure that, as has been suggested, the

extra-peritoneal did not represent the simple, and the *intra*-peritoneal the complicated, cases. The difference was simply that of long or short pedicle. Whenever the pedicle was long enough, I used to employ a clamp whatever might be the complications of the case; and in short pedicles I used the ligature or cautery, whether the case was otherwise simple or the reverse. To my mind, one great merit of the antiseptic system is that it has made the *intra*-peritoneal method, which was formerly the less, now the more successful method of dealing with the pedicle. Formerly, septic changes, which are now scarcely ever observed, frequently took place in or about the tied pedicle, and the many disadvantages of the *extra*-peritoneal method, which were only counterbalanced by its greater success, have no longer to be endured.

Another great gain from the antiseptic system is that drainage of the peritoneal cavity is now scarcely ever necessary. In the paper which I brought before the Medical and Chirurgical Society on completing 800 cases, I contended that drainage should only be an exceptional practice. But I did not then imagine that it could be almost entirely discarded. I can now say that I have not drained one case in which antiseptic precautions have been taken; and on looking back, I cannot believe that there are more than two in which, if a drainage tube had been used, it could have been useful. The simple explanation is, that the mixture of blood, other fluids, and air left in the peritoneal cavity, or oozing into it after operation, formerly went through putrefactive changes, and if not drained off produced septicæmia, whereas now no putrefaction takes place, and absorption is quite harmless.

It will be gathered from these remarks that the chief modifications in my practice have been the use of the carbolic spray during the operation, the soaking of the sponges, silk, and instruments in a solution of the acid, tying the pedicle, and leaving it in the cavity, and the disuse of drainage tubes even in unpromising cases.

I now turn to the question of results. I am convinced that by the use of antiseptics, especially of phenol, those patients who have recovered have suffered much less from fever, while convalescence has been more rapid than it used to be. Formerly, temperatures of 100° to 103° were usual, and 104°

to 107° not very uncommon. And the head was cooled by ice in at least half the cases. Now, cold to the head is scarcely ever thought of, certainly not used in one case in twenty, and a temperature of 102° is rare. Recovery with a temperature which never rises above 100° is the rule.

This alone is an important step in advance, especially as it affects the well-being of the great majority of patients, and for those in hospitals lessens considerably the cost of their maintenance.

The table which I now offer may help in the examination of the question of the influence of the antiseptic system on my practice, though it shows at the same time how complex the problem is, and how much more evidence is wanted before it can be cleared up.

Table of Cases of Ovariotomy, showing the Mortality before and after Antiseptics.

	Cases	Deaths	Mortality per cent.
Hospital. Years 1876–77 . .	71	7	9·8
Private. Same time . . .	81	22	27·1
Hospital and private cases together 1876–77	152	29	18·4
165 private cases from Dec. 1873 to Dec. 1877	165	42	25·4
165 private cases from Jan. 1878 to Dec. 1881	165	16	9·6

The first and last entries would almost settle the whole matter negatively if they stood alone. The series of 165 cases done antiseptically cannot be said to be better than the 71 hospital cases done according to my former custom. Taken together they only make it evident that under given conditions ovariotomy can be practised as successfully one way as the other. But if I compare the private cases which I did during the two last years of my hospital work with the cases which came after them, the contrast is very striking. I had 81 cases with 22 deaths, a mortality of 27·1 per cent., and this would make the benefit of antiseptics seem to be as much as 17 per cent. Putting, however, the whole practice of those two years together, hospital as well as private cases, the advantage became a trifle less than 9 per cent. Still, as all the circumstances of the two series were so different, they afford no real ground for

forming a judgment. I test the matter yet further, and take the 165 cases which I operated on under the old system before 1878, and, placing their results against those which came out of the succeeding 165 cases, it leaves a balance of about 15 per cent. apparently in favour of antiseptics. If there were no other points to be considered beside those involved in mere figures, a difference of mortality to this extent would be decisive. But in the first place the patients have all had the advantages belonging to a position in life above that of hospital cases. Then the abandonment of the clamp and the use of the ligature with the intra-peritoneal treatment of the pedicle took place at the time of the other change of dressing and the use of the spray; and I have never put a drainage tube into any one of the wounds. It must be remembered, too, that I have been free from all but the most casual contact with hospital influences, have never attended a post-mortem, never carried about with me the infections picked up in general practice, and having had fewer persons present at my operations have eliminated a great part of an incalculable source of danger. Again, it appears by my reports that four of my last sixteen deaths were caused by septicæmia, so that antisepticism has not abolished this plague of abdominal surgery.

On the other hand, these four deaths are an improvement on the seven hospital deaths, five of which resulted from septicæmia, one from peritonitis, and the seventh from some cause not recorded, but five days after operation, which looks suspicious. The six verified deaths make nearly 9 per cent. from septic causes. Now though it would not be quite fair to say that without antiseptics I should have had a similar mortality, from that cause, in my 165 post-hospital cases, which would have raised the deaths from 16 to 30, because the patients were not similarly situated, it is possible that I should have seen more of some septic disease.

As I have before said, I never felt any inconvenience myself, nor have I seen any of my patients suffer from carbolic poisoning. Still, as other surgeons have encountered that double objection to the spray, it must be taken into account, as well as the depressing influence of the cold on a sick woman prostrated by anæsthetics, and the inconvenience caused by its interference with light.

The question of what proportion of my late results may be due to following the details of Lister's antiseptic plans remains undecided. They certainly have not brought me to the point of seeing no deaths from septicæmia as promised by some of their enthusiastic promoters, nor have they advanced my success in operating beyond what was attained without it; but they seem to have made convalescence more easy and rapid, and to have reduced the number of deaths from septic disease, and perhaps might have prevented every one of the deaths among my last seventy-one hospital cases, for not one of these suffered from any accidental causes of death such as took off at least twelve of the sixteen who died among my antiseptic cases, and are almost always met with in any equal number of patients.

Resuming our survey of the history and progress of ovariotomy since its revival in Great Britain, I must refer to a letter received from Dr. Keith on the 27th of October, 1881, in which he informs me that his number of operation cases was then 381. Of these 340 recovered and 41 died, showing a death rate of 10·76 per cent. But the mortality has gradually diminished, and of the last 140 cases 135 have done well. This presents the astonishing result of a loss of only 3·57 per cent.

He retains his preference for the cautery and says—'In the treatment of the pedicle the best results by far are still got by the cautery. I much prefer the cautery, and think it the most perfect way. Of the last 120 cautery cases there were only two deaths (1·6 per cent.); one of these from cardiac embolism in the third week, the other from supposed carbolic acid poisoning. I have also removed at the vaginal junction nine large uterine fibro-cysts or soft fibroids. Of these eight recovered. Of nearly 400 operations there have been only two mistakes of diagnosis. These were cases of fibro-cystic tumours of the uterus, and not ovarian tumours as was supposed. In both the operation was gone on with, and both patients did well.'

Dr. Keith adds that 'his son has recently done five cases; all recovered,' and I most cordially wish him the same amount of success that has rewarded the skill and judgment of his father.

We have now to follow the advance of the operation in France, Belgium, Germany, Russia, Italy, and Spain, and in America and our colonies, although any such review must necessarily be brief and imperfect.

In France, ovariotomy made but tardy progress; nor was this to be wondered at, when we find a man like Velpeau ('Gazette des Hôpitaux,' 1847, p. 420) writing in this fashion: 'Ce sont de telles témérités qu'il faut repousser de toutes nos forces, parcequ'elles ne sont que preuve de folie. Il est heureux pour l'honneur de notre art et de notre nation que rien de semblable ne se passe ici. C'est en Amérique, c'est en Angleterre, c'est en Allemagne aussi qu'on a vu faire de telles folies. Tous les ans, tous les mois, les journaux étrangers nous apportent la nouvelle de pareilles tentatives, tout le monde les fait, et chose inouïe, c'est de les voir faire par des gens d'un grand mérite.' Notwithstanding Cazeaux's spirited and energetic advocacy at a meeting of the Académie de Médicine, in 1856, the operation was condemned; the papers of Charles Bernard in the 'Archives générales de Médecine,' of the same year, and a very able paper by Dr. Worms, in the 'Gazette hebdomadaire,' 1860, had, however, a better result. Dr. Worms's paper was founded principally upon a careful examination of some of my own early cases. He took the precaution of writing to the medical attendants of the patients, in order to ascertain their condition from the time of operation up to the date of his paper, and this able and spirited advocacy attracted very general attention in France. Perhaps its most important effect was to induce M. Nélaton to visit England for the purpose of witnessing the operation, and carefully studying its details. He was here in 1862, and witnessed several operations. He assisted me at one very complicated case, which terminated successfully, and was much interested in another where tetanus proved fatal. On his return to Paris, he operated himself, and published a classical clinical lecture, from which may be dated the revival of ovariotomy in France. Kœberlé, of Strasburg, performed his first operation in 1862, which was also the date of Nélaton's first operation. It had certainly been performed in France before Nélaton's visit to England. The first case was in 1844, by a country surgeon, Dr. Woyerkowski, of Quingez. This case may be looked upon rather as an accidental than an intentional ovariotomy. The next case was in 1847. The patient had undergone fifty-two tappings, when another country surgeon, M. Vaullegeard, of Condé-sur-Noireau, with remarkable ability and courage, successfully removed a tumour which

weighed about seventeen pounds. The patient recovered perfect health, although she died five years after of 'miliary fever.' After this, until Nélaton's visit to England, the history of ovariotomy in France consists of eight unsuccessful operations by Bach, Maisonneuve, Hergott et Michel, Jobert, Boinet, Richard, Démarquay, and Sedillot. Since 1862, the example of Nélaton in Paris, and the influence of Boinet, followed by the many successful operations of Péan, have done much to legitimize the operation of ovariotomy in the capital of France; but the far larger experience of Kœberlé, of Strasburg, has probably had even a still greater effect.

I have not yet been able to obtain the latest results of the practice of my friend Kœberlé, but Eustache, of Lille, reports him to have had more than 320 operations early in 1881. It seems to be very difficult to obtain accurate information of what has been done recently in this part of surgery in France. In the work of Eustache, which is the latest published on the subject, the figures are deficient and tell us nothing that has taken place within the last two or three years of increasing activity, and better success. It is useless, therefore, to quote them. But Péan has obligingly sent me his report up to the month of October 1881. His gastrotomies altogether amount to 449. Three hundred and six of these were for the removal of ovarian cysts, with 245 recoveries and 61 deaths. But it is the same with Péan as with most other surgeons. His latest work is his best, for out of the last 100 ovariotomies there have been only fourteen bad results; and curiously enough, exactly seven in each of the two last fifties.

I believe I was the first to perform ovariotomy in Belgium, in July 1865, in the chief hospital at Brussels, upon a patient of Dr. Deroubaix, in the presence of a large number of distinguished Belgian surgeons. The operation was completed so easily that it was hoped the example would soon be followed in Belgium; but, unfortunately, the patient died a week after operation, as it was believed from influences almost inseparable from a large general hospital. Still, as the result was unsuccessful, it probably retarded for a time the progress of ovariotomy in Belgium. The first successful case in that country was by a pupil of my own, Dr. Boddaert, of Ghent, who published accounts of the case, very kindly attributing his success

to the minuteness with which he followed every detail of the operation as he had seen it performed by me in England. I had a successful case in Ghent in 1871, and Dr. Boddaert had two successful cases in 1872. These four cases, I am informed, were the only instances of success out of about twenty operations in that country up to that time. Dr. Deroubaix was in England in 1872, with the express object of perfecting his knowledge of the various steps of the operation, and there can be little doubt that he has by this time reaped the reward of his intelligence and zeal. I have no more general information as to what has been done in Belgium, and Dr. Boddaert assures me that it would be impossible to obtain accurate statistics for that country, as many cases remain unpublished. His personal experience, however, to the end of 1881 amounts to this, and it is most worthy of congratulation: 21 cases with 12 recoveries and 9 deaths before antiseptics; 27 cases since antiseptics, with 25 recoveries and only 2 deaths.

I led the way to the practice of ovariotomy in Switzerland by operating on a lady at Zürich in July 1864, who recovered perfectly well and has enjoyed good health up to the present time. Professor Lücke, of Berne, who is now at Strasburg, took it up in 1866, and since that time he has had some thirty or more imitators, who have upon the whole worked with a very commendable success. My friend Dr. Kocher, of Berne, has very diligently collected for me the particulars of nearly all the operations that have been done in Switzerland, and has favoured me by sending most of the letters of his correspondents, so that my information is of the most authentic kind. In all I have accounts of 231 cases, the recent ones having been treated according to Lister's system. The results are 177 recoveries and 54 deaths, a mortality of 23·3 per cent. These 231 cases are divided between some 25 operators, several of whom have only done a single case. Others have had as many as six or ten operations; Professor Socin, of Basle, Dr. Dupont, of Lausanne, and Professor Julliard, of Geneva, eleven and twelve. Dr. Kühn, of St. Gallen, reports 22 cases with 3 deaths, and Professor Bischoff, of Basle, 33 cases of ovariotomy, 8 of which were double, with 7 deaths from peritonitis, all having been performed under carbol spray and with Lister dressing. Four were cases of castration (Battey), both ovaries being

removed, and all these recovered. Professor Müller, of Berne, has done the operation 34 times, with a loss of 5 patients only, and Dr. Kocher himself heads the list with 47 cases and a mortality of no more than 9·5 per cent. since he adopted the antiseptic treatment. One of the fatal cases was most deplorable, as showing that, in spite of the most exact precautions, the life of a patient and the reputation of an operator are at the mercy of thoughtless, if not culpable, imprudence. According to custom, the sponges were counted before and were counted again after the operation. They were fixed in number and not one was wanting. But a sponge was left in the abdomen, and the sister accused an assistant of having torn a sponge in two during the operation. A similar folly was just stopped in time here not long ago, proving that a supplement to my caution as to number and counting is as necessary as the original test. The sponges should not only be counted but identified.

In Germany, until quite recently, ovariotomy was scarcely either talked or thought of. In 1819 and 1820 operations by Chrysmar, and in 1820 by Dzondi, only served to bring the operation into discredit. Dieffenbach, who had long condemned the operation, operated in 1826. He met with great difficulty in arresting the bleeding, but his operation was crowned with success. Martini, Ritter, and others followed Dieffenbach's example, but with so little success that, from 1826 to 1850, only three recoveries were obtained in twenty operations; and, of eighteen completed operations, five proved fatal. Accomplished surgeons—Langenbeck, Heyfelder, Kiwisch, Schulz, Siebold, and Scanzoni—tried what they could do, but failed; and it is not surprising that, for several years, the operation ceased to be practised. In 1866 my volume on 'Diseases of the Ovaries' was translated into German by Küchenmeister. Billroth, who had assisted me, and who had carefully studied the whole subject, began to use his great influence with his countrymen to promote the general acceptance of the operation. Nussbaum, of Munich, came twice to England, assisted me several times, and has performed ovariotomy more frequently than any other German surgeon; and Spiegelberg entered upon a long career of successful operations. Grenser, of Dresden, made known the results of a long visit to

England in an able review of what he saw here; and ovariotomy has undoubtedly now become generally accepted by the profession in Germany as one of the triumphs of surgery.

The work of Grenser was published in 1870, entitled 'Ovariotomy in Germany'; and, as a workman feels the approval of his fellow-workmen, next to the consciousness of saving life, as his highest reward, it was with great satisfaction that I read the dedication to me, 'As a recognition of great services to science and mankind.' He gives the total number of completed cases of ovariotomy in Germany, up to the end of 1869, as one hundred and twenty-nine, seven uncompleted operations, and ten cases of mistaken diagnosis. Of the completed cases, sixty-two recovered, and sixty-seven died. The results of the three operators who had performed the greatest number of operations were somewhat better than the mortality of the whole one hundred and twenty-nine cases. Nussbaum had eighteen recoveries and sixteen deaths; Spiegelberg ten recoveries and six deaths; Stilling eight recoveries and nine deaths—a total of thirty-six recoveries and thirty-one deaths. These results, though very far from satisfactory, are a great deal better than those mentioned by Dutoit, who published, in 1864, tables of the results of ovariotomy in England, Germany, and France, giving the results of the operation in Germany as fifty-one cases, of which only thirteen recovered and thirty-eight died. We now know that the results of ovariotomy in Germany, after the publication of Grenser's work, continued to improve after 1870, as they did between the years 1864 and 1870. Billroth, for instance, writing in November 1871, says: 'Up to the present time, I am tolerably contented with my results. I have personally no reason for supposing that the results will be less cheering in Vienna than they are in London. Hitherto, I have performed ovariotomy nine times, and only two of the patients have died—a mortality of only 22·02 per cent. The first four cases recovered one after the other; then two fatal cases occurred, to be followed again by three recoveries.' Knowing the position which Billroth holds among European surgeons, I cannot refrain from quoting the following passage from the lecture in which the above results are stated: 'After ovariotomy, skilfully performed according to the rules of art, recovery is the general rule, and a fatal issue

the constantly diminishing exception. Comparing it with some other operations, ovariotomy, taking the mass of cases, is shown by statistics to be less dangerous than amputation of the thigh, disarticulation of the shoulder and hip joints, or excision of the hip or knee. Its danger is about the same as that of amputation of the arm, excision of the shoulder, partial excision of the jaw, lithotomy in the young, and similar operations. We must, however, perform ovariotomy strictly according to the rules laid down by the Engish operators in their classical works; and only after having attained the same results should we venture practically to put in force our own ideas, in order to improve upon these. I had the good fortune to see Spencer Wells operate upon two complicated cases, and from them, as well as from oral communication with this remarkable man, I learned much. I constantly follow his precepts, knowing that he has long since thoroughly thought out and tested all that can happen to myself. I shall willingly regard myself during my lifetime as his scholar; and contented shall I be if it falls to my lot, by means of this operation, to snatch from certain death one-half the number of lives he has been enabled to save.' It would be almost impossible to resist the gratification—'laudari à viro laudato'—which any surgeon would feel in republishing remarks like these, coming from such a man as Billroth.

Up to the beginning of 1877 Olshausen tabulated 613 cases by German operators of completed ovariotomy, with 353 recoveries, or 43 per cent. of deaths and 57 per cent. of recoveries. Since the adoption of the antiseptic treatment in Germany, the results obtained by Schroeder, Nussbaum, Olshausen, Esmarch, and many other German surgeons are, to say the least, equal to those announced in any other country.

Professor Schroeder, of Berlin, sends a report of his practice of ovariotomy up to October 31, 1881. It comprises 276 operations, with 39 deaths, one case of myxoma of the ovary and peritoneum being included.

One case of enucleation, &c., in the third hundred is not included.

First hundred	17 deaths
Second hundred	18 „
Last seventy-six	4 or 5·26 per cent.

Of excisions of uterine myxomas intra-peritoneally treated there were eleven recoveries one after the other. Two of these were very small and removed during ovariotomy.

I have received from Professor Nussbaum the following report of his ovariotomy practice:—

'From February 26, 1861, to October 31, 1881, I have done ovariotomy 332 times, with 83 deaths. Fourteen were cases of double ovariotomy, and I must beg it to be understood that all the patients were in such an advanced state of disease that they must have died without operation.

Of my first	100 cases	37 died
„ second	„	26 „
„ third	„	16 „
„ last	32 cases	4 „

'Before using Lister's antiseptic system I had made 84 ovariotomies, with a loss of 38 cases.

'Since adopting the spray I have had 248 operations and only 45 deaths (18·14 per cent.).

'*History of my* 332 *Ovariotomies.*

'My first five patients died, and I was so disheartened that I left off operating. In 1864 I went to London, and there learnt from Spencer Wells the toilette of the peritoneum.

'The first 78 cases were treated with the clamp, extra-peritoneal, and 35 died. In 6 I tried vaginal drainage, and 3 died. In 62 of the remaining 248 I followed the practice of Kœberlé, with 19 deaths. In 168 the pedicle was tied with catgut, cauterised with the thermo-cautère and dropped in, and there were 26 deaths. All these cases were done under Lister's spray and had his dressings.

'*Remarks.*—Eleven of the women operated on have since had children.

'325 were cases of cystoid ovarian tumours. In seven cases the ovaries were removed on account of hæmorrhage and fibroid tumours of the uterus; four died.

'The causes of the 83 deaths were in

'20 collapse.

'44 septicæmia.

'19 various—pleuritis, pneumonia, marasmus, typhus, diphtheria, hæmorrhage.

'With the exception of the castration cases the smallest mass removed weighed 65 grammes and was infiltrated with pus; the largest weighed 51 kilo. (102 pounds). This patient died after 20 hours, without having secreted one drop of urine.

'The youngest patient was 17 years of age and the oldest 75. She recovered without fever.

'The case of a girl, four years old, from whom I removed an ovary from a strangulated hernia, has not been counted as an ovariotomy. The shortest stay in the hospital was 14 days, and the longest five months.

'One of the cases treated with the clamp on the extra-peritoneal system, and 22 done with the spray and antiseptic management, recovered without any rise of temperature or feeling of illness.

'The most serious complications met with were cancer, adhesions of the intestines and to the diaphragm, identification of the intestine with the cyst, and one case in which a part of the ureter was cut away was cured by making an artificial ureter.'

I also herewith give a translation of part of a letter received in November 1881 from Professor Olshausen, of Halle.

'The ovariotomies I have performed antiseptically are—

From July 29 to December 31, 1876		8 cases
In the year	1877	16 „
„	1878	33 „
„	1879	23 „
„	1880	29 „
And to October	1881	32 „
In all, from July 29, 1876, to October 24, 1881		141 cases

'All these operations were done under carbolic acid spray. Of the cases operated on 20 died = 14·2 per cent. Another died of carcinoma 40 days after the operation.

'The causes of death were—

Shock	5 cases
Peritonitis, septicæmia	8 „
Ileus on the 2nd and 30th day	2 „
Pulmonary embolism, 8th and 37th day	2 „
Amyloid of kidney, 20th day	1 case
Tetanus, 13th and 19th day	2 cases

'Of the first 50 cases one died from shock and five from septicæmia.

'Of the second 50 cases three died from shock and two from septicæmia.

'Of the last 41 cases one died from shock and one from septicæmia.

'In the one case of ileus ovariotomy was done during the ileus, and did not prevent the death of the patient.

'In the case of amyloid kidney the operation itself was successful, but the disease, which was already in an advanced stage, made rapid progress afterwards.

'The pulmonary embolism which occurred on the 37th day was not in any way connected with the operation.

'Among the 141 ovariotomies nine were cases of removal of both ovaries, and all recovered; four patients were operated on during pregnancy at the second, fourth, sixth, and ninth months, and all recovered. The patient operated on at the sixth month aborted. The others went on to the full time.'

Professor Billroth, of Vienna, has very kindly sent me his statistics up to the end of October 1881, arranged by himself in the following tables.

TABLE I.

Ovariotomies from 1865 *to End of October* 1881.

	Number	Died	Mortality per cent.
Total number	222	80	36

Difficulties of the Operations.

	Number	Died	Mortality per cent.
I. None or very slight adhesions of omentum	55	9	16·4
II. Extensive adhesions to anterior abdominal wall	97	30	30·9
III. Extensive adhesions deep in the pelvis, or with mesentery, intestine, bladder, uterus, &c.	65	37	56·9
IV. Suppurating or putrefying cysts —fever patients	5	4	80

Arranged according to Age.

	Number	Died	Mortality per cent.
13–20	21	5	23·8
21–30	56	17	30·3

TABLE I.—*continued.*

	Number	Died	Mortality per cent.
31–40	75	31	41·3
41–50	50	18	36
51–63	20	9	45

Arranged in series of 50.

	Number	Died	Mortality per cent.
1–50	50	25	50
51–100	50	17	34
101–150	50	18	36
150–200	50	16	32
200–222	22	4	18

Treatment of Pedicle.

	Number	Died	Mortality per cent.
Extra-peritoneal, with clamp	79	25	31·6
Intra-peritoneal	143	55	38·4

Ovariotomies before the use of Boiled Carbolized Silk.

	Number	Died	Mortality per cent.
Total number	76	31	40·8

Ovariotomies after the use of Boiled Carbolized Silk.

	Number	Died	Mortality per cent.
Total number	146	49	33·4
Of those with spray	71	29	40·8
„ without spray	75	20	26·6

TABLE II.

Hospital Cases.

	Number	Died	Mortality per cent.
Total number	140	52	37·1
Of those before the use of boiled carbolized silk	26	13	50
After the use of boiled carbolized silk	114	39	34·2

In Private Practice or in 'Maisons de Santé.'

	Number	Died	Mortality per cent.
Total number	82	28	34·1
Before the use of boiled carbolized silk	50	18	36
After the use of boiled carbolized silk	32	10	31·2

Ovariotomies, excluding Cases of Malignant Tumours.

	Number	Died	Mortality per cent.
Simple and multiple cysts	1	66	32·8

TABLE II.—*continued.*

Difficulties of the Operations as above.

I.	53	9	16·9
II.	89	23	25·7
III.	54	29	53·7
IV.	5	4	80

Malignant Ovarian Tumours.

	Number	Died	Mortality per cent.
Total number	21	14	66·6
Of these carcinoma	14	11	78·5
„ sarcoma	7	3	42·8

Billroth has added the following important remarks:—

'I must explain that only within the last three years have I begun, in cases really too difficult, to close the abdominal incision and leave the operation incomplete. Up till three years ago I finished at any cost every operation that I began, and this naturally made the statistics worse. In the last three years I have closed the wound in 12 cases, and not one of the patients has died in consequence of the incision. I attach very little importance to figures in relation to a method of operating. My opinion is as follows. Granted that the operation is well done, and that the patient does not die within about twenty-four hours from loss of blood or shock (which has occurred to me only 4 times in 222 cases), the result depends upon whether *sponges*, *fingers*, *instruments*, *secretions*, and ABOVE ALL the *ligature threads*, are *clean*. If this be so all get well. Three weeks ago I operated on a carcinoma of the ovary which had grown through small intestine and the bladder. I cut away 8 centimetres of small intestine, completed the enteroraphie; then I cut away the upper part of the bladder and united it with 20 sutures. The recovery was as free from fever as in the simplest case, and the patient was discharged cured after 20 days.'

In the north of Europe, Dr. Sköldberg, of Stockholm, deserves the credit of promulgating, by his example and writings, the knowledge of the operation in Sweden. He published a valuable treatise in 1867, and he visited England again in 1872, when he informed me that he had performed 28 operations, with a result of 24 recoveries and 4 deaths. Soon after his return to Sweden he died, but in the interval added two more successful cases to his list. This success naturally had a

great influence in Sweden; and Dr. Howitz, of Copenhagen, and Professor Nicolaysen, of Christiania, who both assisted me many times, have done good service with their Danish and Norwegian countrymen. Arendrup, of Copenhagen, who had highly qualified himself by assiduous study here for the high position he appeared destined to fill in his native country, died too early—a victim to overwork in the Paris hospitals during the siege.

I have a return from Denmark by Dr. Leopold Meyer of 41 operations by Starfeldt and Stadfelt, with 30 recoveries and 11 deaths; four cases before antiseptics furnished two of these deaths. No information has been received from Professor Howitz.

Professor Nicolaysen has sent me the accompanying tables which represent the state of ovariotomy in Norway up to the present time.

Statistics of the Mortality after Ovariotomy in Norway, from 1864–1882.

Place	Total number of operations	Total number of deaths	Name of operator	Remarks
Kristiania	56	22	Professor Nicolaysen	
	23	9	Professor Voss	
	3	1	Dr. Kicer	
	3	1	Dr. Malthe	
	1	—	Dr. Hald	
	1	1	Dr. Klem	
	1	1	Professor Hjort	
Bergen	1	—	Professor Nicolaysen	
	1*	1	Dr. Kahrs	*Not completed
	2	—	Dr. H. Vogt	
Molde	4	3	Dr. Höegh	
Stavanger	1*	1	Dr. Stang	*Not completed
Flekkefjord	1*	1	Professor Nicolaysen	*Not completed
Porsgrund	2	1	Dr. Munk	
Holmestrand	1	1	Professor Nicolaysen	
Frederikshald	3	2	Dr. Roll	
	104	45		

Mortality per cent. 43·27.

Since the year 1878 Professor Nicolaysen in Kristiania has applied full Listerism in 24 operations (carbolic spray from 2 to 4 per cent.) with the following results:—

Treatment of the pedicle	Total number of operations	Number of deaths
Spencer Wells's clamp . .	14	2
Ligature	8	4
Enucleation	2	—
	24	6

Mortality per cent. 25·00.

In connection with them he makes remarks to this effect: That the great mortality among the early cases was principally due to the delay in seeking relief by operation, as most of the patients had been subjected to long-continued medical treatment leading only to anæmia, adhesions, and all the complications of old cases. This has been in a measure changed of late years, and the operations have taken place at an earlier stage of the disease. At the same time antiseptic precautions have been adopted, the carbolic spray and dressings being used. Professor Nicolaysen adds that, 'after having used sulphurous acid for cleansing the sponges the patients have had no fever and all are recovered.' There is no special hospital in Christiania, and most of the operations have been done in general hospitals, but all those by Professor Nicolaysen since 1878 were in private houses, 'though not always of the best kind.'

In Russia, the first ovariotomy was performed at Charkoff by Professor Vanzetti in 1846, and the second operation at Helsingfors in 1849, by Professor Haartmann. Both cases were unsuccessful. The first successful case was performed by Professor Krassowski, of St. Petersburg, in December 1862, and his results were afterwards so satisfactory that, in 1868, he published the well-known atlas of beautifully coloured plates, with full accounts of 24 cases in which he had completed the operation, and one case of partial extirpation. Of the 24 completed cases, both ovaries were removed in 6—3 successfully, and 3 followed by death. Of the 18 cases where one ovary was removed, there were 10 recoveries and 8 deaths, giving a general total of 13 recoveries and 11 deaths. Writing to me in 1868, Professor Krassowski most kindly assured me that my work had contributed much to the progress of ovariotomy in Russia. Professor Krassowski's example has been followed by many Russian surgeons; and he now obliges me

with a detailed account of what has since been done by himself and others. From this it appears that altogether there have been 302 ovariotomies reported by forty native surgeons in St. Petersburg and the various provinces of Russia. One hundred and sixty-nine of these were successful, leaving 133 deaths. In two of these cases there was accidental perforation of the intestine, without any bad result, but in one case of partial ovariotomy a sponge was forgotten and the patient died. Professor Krassowski himself has operated on 124 patients, completing the removal in 112 cases, with 63 recoveries and 49 deaths, and being obliged to leave it partially done in 12 instances with a loss of 7 patients. One of his operations for ovariotomy was complicated with pregnancy; twice he met with small fibroids of the ovaries, and twice also he had to take away a considerable portion of the omentum. No account is published of many of the ovariotomies done in Russia, and Professor Krassowski is persuaded that the number is much greater than he has been able to collect. All but one of the ovarian cases which have come to me from Russia recovered from the operation. One only died afterwards from obstruction of the intestine. The others have had no return of the disease. I shall have to allude hereafter to the important observations of Dr. Maslowsky upon the pathological phenomena which follow the application of ligatures and of the cautery to a pedicle.

In Italy the first successful ovariotomy was performed by Professor Landi, of Pisa, in September 1868; the second, by Professor Peruzzi, of Lugo, in 1869; the third, by Dr. Marzolo, of Padua, in July 1871. In his account of this operation, Dr. Marzolo says that it is the sixteenth ovariotomy performed in Italy, the results having been 3 recoveries and 13 deaths; and he joins with Landi in urging his countrymen, by courage and perseverance, to emulate the successes of their English brethren.

This they certainly have done even with rapidly improving results. In the first hundred cases performed in Italy Peruzzi proved that the recoveries were 37 and the deaths 63, while in the second hundred these figures were rather more than reversed, the recoveries being 64 and the deaths only 36, a percentage which doubtless will be smaller in the third hundred.

The following paper, which was printed in the 'British

Medical Journal,' November 23, 1878, is interesting in connection with the history of ovariotomy in Italy.

'In the "British Medical Journal" of March 16, 1878, I published a short account of a case sent to me by my friend Dr. Peruzzi, of Lugo, and I arrived at the conclusion which I expressed in these words: "It is very desirable that the specimen should be carefully examined. If it be really an ovary, it will certainly appear that the first case of ovariotomy in Europe was that by Emiliani, of Faenza, in 1815. I have written to Dr. Peruzzi, suggesting that the specimen should be examined by some competent morbid anatomist."

'Dr. Peruzzi cordially acted upon my suggestion, and I had the pleasure of meeting him in Paris last September, and I examined the specimen with him and Dr. Marion Sims, in the laboratory of Professor Ranvier, with whom the specimen was left for a more prolonged examination. Dr. Peruzzi has lately sent me Professor Ranvier's report, of which the following is a literal translation:—

'"A tumour, after long preservation in alcohol, has been submitted to me by Dr. Peruzzi for histological examination. This tumour was brought from the museum of the Medico-Chirurgical Society of Bologna. The surgeon who extirpated it —Dr. Emiliani, of Faenza, in 1815—thought it had been formed by the ovary, but nothing can be distinguished which resembles the Graafian follicles; it is nearly homogeneous (*assez homogène*). Microscopical sections, made in different parts of the morbid mass, were first placed in water; then they were submitted to the action of picrocarminate of ammonia; lastly, they were put up as preparations in glycerine. Owing to the prolonged action of alcohol (sixty-three years) on the specimen, coloration by the picrocarminate is feeble, but it is sufficient to render the elements distinguishable. In all the sections which have been made, we only observe fibrous tissue and blood-vessels. The fibrous tissue is characterised by the connective fasciculi, interlaced in different directions, and by connective cells. The arteries are recognised by their muscular coat, which is well preserved. The veins and capillaries are dilated and filled with blood; the white and red corpuscles are still recognisable, which proves that the preservation of the tumour is relatively good.

'"In none of the preparations that I have made are there any glandular channels, cysts, or Graafian follicles. Still it might be possible that the morbid tissue had originated (*pris naissance*) in the ovary; but then it would be necessary to admit—which is not improbable—that it has caused the complete disappearance of the characteristic elements of that organ.

"L. RANVIER.

"Paris, September 22, 1878."

'The exact size and form of this tumour are well represented

in the annexed woodcut. The length is 9 centimetres ($3\frac{1}{2}$ inches); greatest breadth, 5 centimetres (2 inches); circumference, $15\frac{1}{2}$ centimetres (6 inches).

'Dr. Peruzzi wrote to me that he does not consider this report affects the question of priority in favour of Italy having the first claim to the performance of ovariotomy in Europe.

Nor does he think the clinical history contradictory. The tumour was found the day after the injury, and it is impossible that it could have formed in that short time. It must, therefore, have existed before, and contributed to, the peritonitis which followed the injury; and we know how often ovarian tumours are accidentally discovered.

'All this is incontestable. But I do not think this case can be regarded as a case of ovariotomy in the sense in which this operation has been regarded, from its first performance by McDowell to the present time. Until Battey's recent proposal to remove "normal" ovaries, or ovaries only slightly enlarged, no ovariotomist ever contemplated the removal of an ovary not measuring more than three inches by two inches. The removal of such a tumour could have no more bearing upon the rise of ovariotomy than the removal of a hernial ovary from the inguinal canal. Emiliani, no doubt, believed he had removed a "scirrhous ovary," and it is certain that he removed a fibrous tumour which may or may not have originated in the ovary. Professor Ranvier wrote with extreme caution; but I gather from his report that, as the specimen was sufficiently well preserved for arteries, veins, capillaries, and both red and white blood-corpuscles to be still recognisable, it is, to say the least, very remarkable (presuming the growth to be ovarian) that no Graafian follicles or any characteristic ovarian structure is preserved.'

It is not easy to obtain information as to the number and result of cases of ovariotomy in Spain and Portugal, but there is reason to believe that they do not differ greatly from those of Italy.

In India, as early as 1860, ovariotomy was performed successfully at Tanjore, by a native surgeon. The particulars are given in the 'Medical Times and Gazette' of 1861. In Australia, the success of Tracy and of Martin has been equal to that of their English brethren. In New Zealand, Dr. Mackinnon was the pioneer of ovariotomy at our antipodes. In Canada, the few cases which have been published have been almost all successful; and there is already abundant evidence that ovariotomy may be practised successfully under the most different conditions, and in the most opposite climates.

I know of one case reported from Japan in 1880.

It is impossible to give anything like a full historical sketch of the progress of ovariotomy in America within any reasonable limits. The initiatory work of McDowell has been already described. Atlee stands next to myself in the number of operations he performed. Kimball, of Lowell, Peaslee, Marion Sims, Storer, and many other American surgeons have maintained the reputation of their country in this department of surgery. Works by Atlee and Peaslee were published in 1872, and their European brethren have read with great interest their account of their own work and that of their countrymen.

The recent treatises of Thomas and Emmet give no sufficient details to represent the actual number of ovariotomies in America, but the known skill and perseverance of the surgeons of that continent fully justify us in supposing that they are in no respect behind their European fellow-workers. In the work just issued by Agnew, Professor of Surgery, Pennsylvania, there is a table compiled by Baum of 5,153 cases of ovariotomy, of which 3,651 recovered and 1,502 died = 29·13 mortality per cent. Of these there were—

		Recovered	Died		
Single . . .	4,969	3,531	1,438	=	28·94
Double . . .	183	120	63	=	34·42
During pregnancy .	21	17	4	=	19·05
Twice on same patient	15	12	3	=	20·00

But this table includes cases both of American and European surgeons.

CHAPTER VI.

OVARIAN DISEASE IN ENGLAND, AND THE CONDITIONS AFFECTING THE OPERATION OF OVARIOTOMY.

THE last report of the Registrar-General, the forty-second, is dated 1881, and gives the returns for 1879.

In that year the estimated population of England and Wales was 25,165,336; the number of females 12,917,057, which we may practically regard as 13,000,000. The number of deaths from all causes in the whole population was 526,255; among females only, 254,759.

The number of deaths entered as caused by ovarian or encysted dropsy has varied considerably in successive years. During the five years 1876–80 it rose for three years, attaining the highest point in the third year, then again declined, and in 1880 once more went up. The registration stands thus: for 1876, 327 deaths from ovarian dropsy, 73 after ovariotomy; for 1877, 355 disease, 96 operation; for 1878, 367 disease, 99 operation; for 1879, 255 disease, 88 operation; and for 1880, 298 disease, 86 operation. The report for 1880 is not yet on sale to the public, but Dr. Ogle has obligingly furnished me with the numbers.

Dr. Farr, in his letter to the Registrar-General on the causes of death in 1878, as published in the forty-first annual report, says that the mortality from ovarian dropsy had increased to the number of that year, from 196 in 1851, so that in fact it had more than doubled in twenty-eight years, notwithstanding the many lives saved by ovariotomy. There have, however, been such irregular fluctuations in the number of deaths, that comparison of one year only with any other single year is fallacious; and for the same reason, that any calculations based upon the returns of one year only would be misleading, I prefer taking the average of the registration numbers for

the last five years which are available, that is, from 1876-80 inclusive, as the starting-point of my investigation of some of the problems of the statistics of ovariotomy. This average is a total of 320 deaths from disease and 88 after ovariotomy.

The mean annual rate of mortality in England and Wales for 25 years, 1850 to 1874, from encysted dropsy was 11·1 per million of the whole population; in the years 1875 and 1876 it was 14; in the years 1877 and 1878 it was 15; in 1879 it was again 14; and per million of females 27.

The estimated population, in round numbers, of 25,000,000 in 1879, or for the five years in question, would, at the annual rate of mortality of 14 per million of the whole, or, as given in the last official report, 27 per million of females, furnish 324 deaths from ovarian dropsy, which is within four of the average of registration for our five years. But over and above these 320 deaths from disease is a mortality of 88 after ovariotomy, which, at the old rate of 25 per cent. loss by operation, implies the performance of 352 operations, and the existence of 264 women recovered from the operation, who, without it, would in all probability have died within the year, and raised the total number of deaths from ovarian dropsy to 672.

Of the 12,917,057 females in England and Wales, one of every 19,221 comes annually under treatment, medical or surgical, for ovarian dropsy, and is either cured or reported as dead.

One of every 31,659 dies either of the disease or after ovariotomy, between one-fourth and one-fifth of the deaths following the operation.

Calculations based upon the Registrar's report make it appear that the female population of England and Wales comprises an average of about 11,000 cases of ovarian disease, with an estimated duration of life of four years each; and with each succeeding year an increase of distress and incapacity for taking part in the duties and pleasures of life.

From what has been stated above it seems that only a sixteenth part, or 6·1 per cent. of the 11,000 diseased women, are annually registered as dead, or known to be operated on, that is, come under medical or surgical supervision; the dead fall up to 3·7 per cent., the ovariotomized to 3·2 per cent.;

2·4 per cent. of which number are cured by the operation and 0·8 per cent. die. The remaining 10,328 invalids must be either submitting passively to the progress of their malady, or contenting themselves with palliative measures, with the exception of the few single cyst cases curable by tapping, which, even if we take the figures of Boinet, may be set down in fractions.

Speaking of the last ten years, one may say that formerly of those operated on 75 per cent. were saved from their disease and 25 per cent. died; but at the present time things are so much altered that the mortality after ovariotomy is reduced to 4, 10, 12, or 15 per cent., according to circumstances and the operator, and the risk of the operation is somewhat less than 4 per cent. above that of the disease itself. Or, to put the same thing in other words, if 100 women, having the disease of which most of them would die within the year, and all within four years of misery, were to submit to the operation of ovariotomy, the chances are that 10 or 15 would die after it, but 85 or 90 would regain life and the probability of enjoying it for nearly, and in many instances the whole of, the natural term.

The following memoranda as to the statistics of mortality from ovarian dropsy with which I have recently been favoured by Dr. Ogle will be read with interest.

'In the earlier years of civil registration the number of deaths ascribed to ovarian dropsy was extremely small, doubtless owing to imperfect diagnosis, many deaths which were really due to it being vaguely described as caused by 'dropsy' or 'abdominal tumour.' In the five years 1838–42 only 218 deaths from ovarian dropsy were registered, or an average of 44 a year.

'After this there is a gap in the reports of the Registrar-General, the causes of death not having been abstracted for a period of four years (1843–46). In this interval the attention generally of medical men was directed to the disease, this being the time when Dr. Clay's long series of operations began, and when, moreover, the first successful operation in London was performed.

'Consequently, when the Registrar-General again began to abstract the causes of death, in 1847, we find that the number of deaths ascribed to ovarian disease had suddenly jumped up from the previous average of 44 to 193. The average annual

mortality ascribed to this cause has since that date been as follows:—

Period	Average annual mortality from ovarian dropsy
1847–50	207
1851–55	204
1856–60	242
1861–65	248
1866–70	229
1871–75	222
1876–80	320

These figures are exclusive of deaths ascribed to ovariotomy.

'Limiting ourselves to the decennial period just completed (1871–80), as being that in which the disease has been most completely recognized, and in which registration has been most accurate, we have an average of 271 deaths ascribed annually to ovarian dropsy, to which, however, must be added an average of 70 more ascribed to ovariotomy.

'The maxima, both for ovarian dropsy and for ovariotomy, were in the years 1877 and 1878, when the deaths from the two causes combined numbered 451 and 466 respectively. In the two following years, 1879 and 1880, there was a notable decline in the registered mortality, the deaths from the two causes numbering only 343 in the former year and 384 in the latter.

'This decline in mortality was so sudden and so great—more than 26 per cent.—that it would appear impossible to attribute it entirely to the improved treatment of the disease and the improved methods of operation. Moreover, it is to be noticed that an equally sudden and still greater change in the mortality, but in a contrary direction, occurred in 1875, when the mortality suddenly rose by no less than 85 per cent.'

All these details have a special professional interest. They open up to us a view of the field of labour which lies before us. They give us an impression of the weight of responsibility in the way of preparation for so great a task. They enable us to estimate our powers and resources for attempting it. And while they throw a shadow of regret upon the deficiencies of the past, they certainly do not fail to afford us encouragement, and to make us hope that our art may henceforth prove effec-

tual in lightening the amount of female suffering and rescuing a vast proportion of threatened life.

But there is a great distinction between general statistics, showing what can be done for the disease as a whole, how it can be dealt with as a nosological item, and the question so all important to a sick woman, what can be done for her particular case. She does not know, nor does she want to know, anything about ratios. Her interest centres in herself, and her inquiries naturally confine themselves to what prospect we can offer of cure, and whether there is a chance that we can relieve her without putting her life in too great risk. Or it may come to this, that her sufferings are too great for her to regard the danger, and she only looks at the glimpse of hope which the something to be done gives her, first of relief from her burden, and, as a secondary consideration, of the prolongation of her life when freed from it.

The cases which come under the hands of the surgeon fall naturally into two groups; those in which the condition admits of temporary relief, or in which circumstances make it all that is practicable, and those in which the urgency is such as to demand life-saving measures. I have already dealt with the former series, and pointed out what are the palliative measures that may be resorted to and the limits within which they can be employed with safety. I now proceed to treat of the conditions which indicate the propriety of operative surgical interference, and the considerations which should guide the surgeon in giving his advice, and must be presented to the patient and her friends to aid them to come to a decision to accept or reject it. But of the patients, whose symptoms call for immediate action, and whose distress is equally apparent, some ought to be given the chance of a preliminary tapping, while others must without hesitation be advised to submit to the more severe ordeal of ovariotomy.

A woman with a single unilocular cyst will often suffer to such a degree from rapid accumulation and distension that she must be saved by some means from the effect of mechanical pressure. Once assured that the cyst really is simple, tapping is to be tried; and in fact it should be enforced by almost a refusal to do ovariotomy until it had been tested. But this advice as to tapping, and especially as to renewed tapping, as a

means of cure must be restricted absolutely, as I have before stated, to simple cases in which the cyst is single and the contents clear and non-albuminous. The cases in which all mere palliative considerations are to be put aside are those which come with the tumour developed in a multilocular or dermoid form, and suffer from the local and constitutional effects. A woman thus diseased will be enormously swollen and tormented more than in pregnancy by the distension of the resisting abdominal walls; her physiognomy will betray the mental anguish and the ravages of disease; her respiration will be embarrassed and the heart's action impeded; nutrition will be imperfect, as shown in her wasting; all the ordinary functions will be more or less suspended; she will be suffering a variety of pains direct and sympathetic, and the aggregate of her miseries will be almost insupportable. All this will be manifest in the enfeeblement of her mental powers, in her sleeplessness and restlessness, in her inability to go upstairs without breathlessness, to walk more than half a mile without exhaustion, in her want of appetite or impaired digestion, in the irregularities of the action of the intestines, kidneys, and other organs, in the daily increasing difficulty of fulfilling her domestic duties, and, among the poor, by the reluctant giving up of her means of living. Here there must be no faltering, no suggestion of alternatives or delay. Justice to the patient demands a most positive recommendation of excision, and a clear explanation of the motives which should influence assent in all cases where the contra-indications which I shall afterwards mention do not exist. And generally, when no secondary circumstances intervene, the advice for the operation should be accompanied by a warning against the danger of delay. It is not often desirable to detail to a patient or the friends all the grounds upon which this advice is founded; but every one who takes upon himself the responsibility of such counsel should have a clear idea of the whole of the base upon which it rests. And it may be traced out summarily in this form. The general health has already deteriorated, and though the tumour itself be not malignant, and it may contain nothing more than normal tissues and fluid so hermetically encased that it has no immediate influence, as is proved by the long detention of purulent matter without secondary symptoms, yet its mere presence is

manifestly the cause of the patient's decline. To let things go from bad to worse without doing anything, especially when that worse is a certainty, would be acting against the very first principles of medical science. And that the worse must come, and quickly too, in all but a few exceptional instances, is only too well known to everybody. Then the unnatural presence of this morbid growth in the body, where it takes up the space belonging to other organs and may propagate its own evil influence, gives rise to other diseases. It attaches itself oftentimes to the intestines which are in contact with it, mechanically blocks the passage through them, or causes fatal contractions, and, at the very least, impairs their functions and hinders the due assimilation of food and nourishment of the body. As for the bad effects which it produces on the action of the thoracic organs, it needs only that I refer to a valuable paper read by Dr. Day before the Royal Medico-Chirurgical Society in April 1875. He therein points out the many dangers which threaten life and render more riskful the operation by allowing time for the balance of the action of the heart and lungs to be deranged, and for structural changes to take place, which, if not immediately fatal or sufficient to mar the operation, embitter after-days and render almost nugatory what has been done.

As time advances, the natural tendency of the tumour to degenerative changes finds scope for progress. Whatever its tissues may be, they are never lastingly normal, have a precarious parasitic existence, gain their supply of blood as it were surreptitiously, and are easily thrown into the condition of atrophic decay. The expansion of the membranous compartments obliterates the vessels, fatty and other changes occur, and rupture is always imminent. The contents too, whatever they may have been at first, alter in their character and become less and less benign. And it would be contrary to analogy to say that by too long waiting sympathetic morbid action may not be set up in the corresponding organ, and thus make the ablation of both instead of a single operation imperative.

Time, too, gives the opportunity for adhesions to form, and though I do not regard the ordinary amount of them as much influencing the success of ovariotomy, there is no guarantee

that they may not elect the pelvis as their seat and become insuperable. And accidents may befall a woman in this condition of suspense. There is no available assurance against them, and they may induce rupture or destructive peritonitis. With some tumours growing on a long pedicle twisting may occur, with all the concurrent probabilities of hæmorrhage and exhaustion. I have but little to say about the contingency of conception and pregnancy, because it is an avoidable complication. Still it is no less to be thought of and made the subject of warning. Finally, if an operation has been proposed and accepted by the patient and those interested in her, it must be taken for granted that none of the contra-indications hereafter to be noticed are present, and that everything being then and there reasonably favourable for success has formed part of the argument authorizing an operation. Who can promise a more auspicious moment in the future? This is not the province of the surgeon. His responsibility ends with his advice as to fact and time, and in the interval between his advice and action it is for the patient to decide whether or not and when her life is to be hazarded.

In many cases ovariotomy may be performed with a confident hope of a successful result; in others the probabilities of success or failure may be about equal, while in some the hope of success is so small, that most patients, who are told the whole truth, prefer waiting for the natural termination of the disease to voluntarily placing their lives in immediate peril. Some, however, would urge the unwilling surgeon to operate against his better judgment, and I have often yielded to the solicitations of patients who, their sufferings being great and death being inevitable at no distant period, have preferred running any risk rather than submit to a continuation of suffering to be ended by certain death. In only one case have I refused to operate when pressed to do so by a patient capable of appreciating the difficulties of the position. In this case, a woman in the Samaritan Hospital suffered, as I believed, from malignant disease, involving the uterus and both ovaries, and having a large quantity of fluid free in the peritoneal cavity; I removed this fluid, but refused to do more, although the woman threatened to commit suicide if I did not operate After her death, the correctness of the diagnosis was

fully borne out. I have heard of some few cases where patients whom I had dissuaded from the operation have been encouraged by others to submit to it, and, with one exception, every such patient has died after the operation. The exceptional case was a woman who had been several times tapped, and who had been advised both by Dr. Keith and by me not to think of ovariotomy so long as life could be made tolerable by tappings. Fifteen months after I saw her the tumour was removed by Dr. Graham, of Liverpool, who encountered and overcame the pelvic and other adhesions which Dr. Keith and I both recognized, and obtained the satisfaction of saving a life otherwise inevitably lost. I have thought it necessary to make this statement distinctly, because it has been supposed that ovariotomy has been restricted to favourable cases only, and that good results had been obtained by refusing to operate upon any but selected cases. Indeed, this was the case in the early days of ovariotomy in this country. Dr Frederick Bird, for instance, published numerous cases where, after making a small incision, and finding the cyst adherent, he did not proceed with the operation; and Dr. Clay, of Manchester, does not appear to have performed ovariotomy upon more than an eighth of the patients with ovarian tumours who consulted him.

Before going into the numerical examination of the question as to how far the age and condition of the patient, the size of the tumour, the existence of adhesions, the length of the pedicle, and any other particulars which can be ascertained or made out with tolerable accuracy when the question of operation is discussed, have affected the result in the 1,000 cases upon which this volume is founded, I think we may conclude that this experience has now been sufficient to warrant the acceptance of some such rule as the following:—

The probable result of ovariotomy can be estimated with far greater accuracy by a knowledge of the general condition of the patient, than by the size and condition of the tumour.

In other words, a large tumour, extensively adherent, in a patient whose heart and lungs, and digestive and elimination organs, are healthy, and whose mind is well regulated, may be removed with a far greater probability of success than a small unattached cyst from a patient who is anæmic or leukæmic,

whose heart is feeble, whose assimilation and elimination are imperfect, or whose mind is too readily acted upon by either exciting or depressing causes. I believe this to be the explanation of the facts which have led some superficial observers to assert that the more advanced the disease the greater, and the earlier the stage of the disease the less, is the probability of recovery. I am convinced that this reasoning is based on the observation of a few exceptional cases where small unattached tumours have been removed with a fatal result from unhealthy persons; or where large attached tumours have been successfully removed from persons who have otherwise been constitutionally sound; but small unattached tumours in strong healthy persons by no means give the best results. It is possible to operate too early as well as too late—to place a patient's life in peril by operation before it is endangered by the disease; just as it is possible, on the other hand, to delay operation until the powers of life are so exhausted that recovery after a severe operation is impossible. In the same way, a strong man in full health, with a limb crushed by a railway accident or shattered by a bullet, bears amputation worse than another man who, on account of diseased knee-joint, has been confined to his room for weeks or months; or a woman who has become accustomed to the confinement of a sick room, has lost flesh, and has been brought by her suffering to dread the operation less than the disease, bears the removal of an ovarian tumour, even though large and adherent, better than one whose whole course of life is suddenly changed from the performance of ordinary active duties to the enforced quiet and confinement in bed which necessarily follow ovariotomy.

SIZE.

The *size* of an ovarian tumour has not, by itself, appeared to affect the result; but size and solidity together, by affecting the length of the incision necessary for the removal, appear to be of some importance. If there be but little solid or semi-solid substance present—which is generally easily discovered before operation—large adherent cysts holding fifty, sixty, or seventy pounds of fluid may be removed, after the contents of the cyst have been evacuated, through an opening only just

large enough to admit one of the operator's hands. The result of such cases has been satisfactory; but the mortality has been greater when longer incisions have been necessary. The number of inches is a very imperfect mode of judging of the length of incision in these cases; for in a small woman with a tumour of moderate size, an incision of eight or ten inches would extend almost from sternum to pubes; while in a large woman, whose abdomen is greatly distended by a large cyst, an incision of this length may be made below the umbilicus, and after the contraction of the abdominal wall, the cicatrix may not be more than three or four inches long; so that, in examining a case for operation, it becomes important to judge whether a cyst or tumour can be removed by an incision which does not extend above the umbilicus. If this can be done, the probability of success is much greater than when it becomes necessary to extend the incision much above the umbilicus. On this point some further information may be found in another chapter.

ADHESIONS.

In 296 cases out of the first 500 there were no adhesions, or they were so slight as to be almost unnoticed; of these patients 237 recovered and 59 died, the mortality being 19·93 per cent. In 204 cases, adhesions were very extensive: of these patients 136 recovered and 68 died—a mortality of 33·33 per cent. This would show that the mortality of cases where there are considerable adhesions is about 13 per cent. greater than in cases where there are no, or only trifling, adhesions. But a more careful examination of each case appears to confirm the conclusion at which I arrived some years ago, that adhesions to the abdominal wall, or omentum only, have but little influence upon the mortality, and that the importance which has been attached to the diagnosis of adhesions before operation has been greatly and unnecessarily exaggerated. At the same time the diagnosis of adhesions within the pelvis is of very great importance, as the attachments to the bladder or rectum may be almost inseparable without great and immediate danger to life. The same may be said of attachments to the liver, stomach, spleen, or around the brim of the pelvis, the separation of which would endanger the iliac vessels or the ureters. I

formerly believed that the closeness of the connection between the uterus and the ovarian tumour—in other words, the length of the pedicle—was a grave matter, as upon its extent depended the possibility of keeping the end of the secured pedicle outside the peritoneal cavity, or the necessity for leaving it within this cavity. But during the last three years, having quite abandoned the extra-peritoneal treatment of the pedicle, a short pedicle, or close connection between cyst and uterus, only becomes important in leading to greater difficulty in securing bleeding vessels. But it also leads to the necessity for uniting the peritoneal edges of the divided pedicle, or separated tumour, by suture, in order to avoid dangers which will be pointed out fully in the chapter on the operation.

I leave the remarks made upon adhesions in 1872 to stand as they were then written with the exception of the last two or three sentences. The table which I now give illustrating the same subject explains the very little modification of my opinion. The general mortality has diminished and that of the cases without adhesions, or adhesions only to the parietes and omentum, remains the same, as will be seen if these four classes are put together. But the mortality among the bad cases is in excess, thus increasing somewhat our estimate of the risk arising from the intestinal, cystic, uterine, and pelvic attachments.

Table showing the effect of Adhesions upon the Results of Operations in the Second 500 Cases of Ovariotomy.

Adhesions	Cases	Recoveries	Deaths	Mortality per cent.
None	212	183	29	13·67
Parietal	61	50	11	18
Parietal and omental . .	63	51	12	19
Omental	62	47	15	24·19
Intestinal, pelvic and others	102	64	38	37·25
	500	395	105	21

Thus far as regards the question of the effect of adhesions upon the operation. But when we turn to that of cure of the miscellaneous group of ovarian sufferers who present themselves to us for help the case is very different, for to the deaths after ovariotomy, really attributable to adhesions, must be added all the instances of failure of relief by

exploratory incisions and incomplete operations, as well as those which are dismissed as affording no chance of success because of the hindrance of this complication. These considerations add to the gravity with which we ought to ponder on this phase of ovarian disease, and lead us to urge with more emphasis how essential it is to use all precautions against the formation of adhesions; and they also force upon our attention a strong argument against every unnecessary delay in operating.

AGE.

In order to examine the influence of the *age* of a patient upon the result of ovariotomy, I have prepared the following tables, which show the ages of one thousand patients upon whom this operation was completed, with the result:—

First Five Hundred.

Ages	Cases	Recoveries	Deaths	Mortality per cent.
From 15 to 20 .	12	12	0	0
„ 20 „ 25 .	52	43	9	17·3
„ 25 „ 30 .	72	54	18	25
„ 30 „ 35 .	69	47	22	31·88
„ 35 „ 40 .	65	48	17	26·15
„ 40 „ 45 .	74	62	12	16·21
„ 45 „ 50 .	55	37	18	32·72
„ 50 „ 55 .	62	41	21	33·87
„ 55 „ 60 .	31	22	9	29·03
„ 60 „ 65 .	6	5	1	16·66
„ 65 „ 70 .	2	2	0	0
	500	373	127	25·4

Second Five Hundred.

Ages	Cases	Recoveries	Deaths	Mortality per cent.
Under 15 . .	2	2		0
From 15 to 20 .	16	14	2	12·5
„ 20 „ 25 .	45	40	5	11·11
„ 25 „ 30 .	63	50	13	20·63
„ 30 „ 35 .	72	60	12	16·66
„ 35 „ 40 .	70	55	15	21·42
„ 40 „ 45 .	44	36	8	18·18
„ 45 „ 50 .	54	37	17	31·48
„ 50 „ 55 .	57	45	12	21·05
„ 55 „ 60 .	38	25	13	34·21
„ 60 „ 65 .	27	23	4	14·81
„ 65 „ 70 .	10	7	3	30
Above 70 . .	2	1	1	50
	500	395	105	21

The entire Thousand.

Ages	Cases	Recoveries	Deaths	Mortality per cent.
Under 15 . .	2	2	0	0
From 15 to 20 .	28	26	2	7·14
„ 20 „ 25 .	97	83	14	14·43
„ 25 „ 30 .	135	104	31	22·96
„ 30 „ 35 .	141	107	34	24·11
„ 35 „ 40 .	135	103	32	23·7
„ 40 „ 45 .	118	98	20	16·94
„ 45 „ 50 .	109	74	35	32·11
„ 50 „ 55 .	119	86	33	27·73
„ 55 „ 60 .	69	47	22	31·88
„ 60 „ 65 .	33	28	5	15·15
„ 65 „ 70 .	12	9	3	25
Above 70 . .	2	1	1	50
	1,000	768	232	23·2

I have divided the two series of 500 cases, and given separate tables for them. In both, the small mortality shown in patients below the age of twenty-five and above the age of sixty, and the comparatively high mortality between those ages, except from forty to forty-five, are remarkable.

Neither of the tables has any important variations. The average age of the patients proves to be as near as possible thirty-nine years.

MORTALITY AT DIFFERENT AGES.

In reference to this subject Dr. Ogle writes to me thus: 'Among the 3,414 deaths ascribed in the past ten years either to ovarian dropsy or to ovariotomy, were two of girls under 15 years of age, and seven of women over 85 years of age. The greatest absolute number occurred between the ages of 45 and 55, and next to this came the decennia on either side of this period of life.'

Deaths.

	Ovarian dropsy	Ovariotomy
1871	194	33
1872	200	46
1873	207	51
1874	168	56
1875	343	72
1876	327	73
1877	355	96
1878	367	99
1879	255	88
1880	298	86
Total in 10 years	2,714	700

The actual numbers of deaths, however, at each period of life give by themselves no information as to the comparative fatality of this disease at different ages. To get this we must take into account the different numbers of women living at each period. Doing this, we have the following rates of mortality from ovarian dropsy and ovariotomy per million females living at each period of life :—

Period of life. Years	Total number of deaths in ten years	Mean annual death-rate per million women living at that period of life *
0	0	0
10	2	2
15	63	5
20	146	13
25	527	28
35	699	49
45	868	79
55	653	87
65	358	82
75	91	56
85 and upwards	7	28
From 10 years upwards	3,414	37

* N.B.—For these rates the nearest whole number is taken, so as to avoid decimals.

'It thus appears that the time of life when this disease is most fatal, that is, causes most deaths in proportion to the number living, is from 55 to 65, and the next fatal periods are the decennia on either side of this.'

CONJUGAL CONDITION.

Of the first five hundred patients there were—

	Cases	Recoveries	Deaths	Mortality per cent.
Married	279	204	75	26·84
Single	221	169	52	23·52
	500	373	127	25·4
Second Five Hundred.				
Married	290	235	55	18·96
Single	210	160	50	23 8
	500	395	105	21
The whole Thousand.				
Married	569	439	130	22·84
Single	431	329	102	23·66
	1,000	768	232	23·2

This shows that the mortality was nearly equal among married and unmarried women at all ages.

SOCIAL CONDITION.

I need not say that the results of operations in hospital and private practice are affected by many other causes besides the social condition of the patients ; but it may be of some value in ascertaining the effect of modes and habits of life of patients upon the mortality of ovariotomy to state, that in the first five hundred cases there were—

	Cases	Recoveries	Deaths	Mortality per cent.
Total hospital cases	240	176	64	26·66
Total private cases	260	197	63	24·23
	500	373	127	25·4

that in the second five hundred cases there were—

Total hospital cases	163	128	35	20·85
Total private cases	337	267	70	20·77
	500	395	105	21

It will be seen that the figures do not correspond in the two series of cases. In the first five hundred, the mortality was rather above the average among the hospital patients, and rather below it among the cases operated on at their homes or in nursing houses. But the difference is not very great, and may perhaps be accounted for by the facts that most of my early operations were done in what was called hospital, without being really more than hired rooms wanting all the accessories successively obtained in after-years; that the nursing was intrusted to inexperienced women, and that the after-treatment lacked the aptitude and knowledge which we have since acquired. In the second series, the rate of death is so nearly equal, that it almost becomes a matter of congratulation for our poorer patients, when we compare the results with the belief formerly entertained by some writers that deaths have been chiefly among poor women, and that this is not accidental. My experience certainly does not support the conclusion that 'the social position of the patient has a good deal to do with the result.' Some few have been ill-fed and overworked, but I can scarcely count among my whole list of 403 hospital cases more than a very few who could actually be ranked as paupers, and scarcely one without either home, husband, or occupation:—

The whole thousand cases stand thus:—

	Cases	Recoveries	Deaths	Mortality per cent.
Hospital . . .	403	304	99	24·56
Private . . .	597	464	133	22·27
	1,000	768	232	23·2

Many of these private operations have been performed in the houses now becoming common in London, where, under the name of 'Nursing Institution,' or 'Home for Invalids,' or some such title, it is intended that a patient shall obtain the conjoint advantages of a hospital and of home or private apartments. There can be no doubt of the advantages of such houses to patients, or of the great convenience to the surgeon, provided the management is good. But they must always be open to the objection of subjecting one patient, more or less, to the influence of others in adjoining rooms or in the same house. And it is interesting to notice that, whereas in a series of 300 cases the mortality in private houses was 25·38 per

cent., and in the Samaritan Hospital 25·60 per cent., it was 26·66 per cent. in the nursing homes. The numbers are as follows :—

	Cases	Recoveries	Deaths	Mortality per cent.
Private houses . .	130	97	33	25·38
Samaritan hospital .	125	93	32	25·60
Nursing homes . .	45	33	12	26·66

I may add that these houses were situated in Upper Wimpole Street, Great Marylebone Street, Manchester Street, Marylebone Road, and Blandford Square, positions not very different from that of the Samaritan Hospital. I am convinced that some of the deaths, both in hospital and in the nursing establishments, have been due to the injurious influence of other patients upon the subject of the operation; an influence which would not have been felt in a private house. Apart from all question of antiseptics, my belief is that, in the one case, if any important peritonitis follow the operation, the inflammation is almost always local, not attended by much effusion of serum, nor by elevation of temperature or other signs of fever or blood-poisoning; whereas, under unfavourable sanitary conditions, the inflammation is diffused, is accompanied by the rapid effusion of a considerable amount of fluid, with great elevation of temperature and other indications of septicæmia. I am becoming more and more doubtful if we ever see this latter chain of symptoms, either in hospital or in healthy houses, if the patients are kept quite free from the access, by contagion or infection, of the poisonous material—solid, liquid, or gaseous —which acts as certainly as an inoculated particle of smallpox or vaccine virus, or as the inspiration of an infective atmosphere in scarlatina, and from which the patient is absolutely safe in the absence of the poison.

INFLUENCE OF SEASON.

In the first 200 cases the mortality was rather lower in the spring and summer than in the autumn and winter months. It was highest in December and January, but it was lowest in November and March. Hence, looking to the small difference between the mean temperatures of November and December —the months of lowest and highest mortality, or between

January and March — the months of the next highest and lowest mortality, it seems probable that the result of ovariotomy is more influenced by some exceptional atmospheric and climatic conditions than by the season when it is performed. And this opinion is confirmed by the results of the 300 cases which succeed the first 200, for in the third hundred the greatest mortality was in November, while in the fourth and fifth it was pretty equally distributed over the whole year. This is all that I was able to say in 1872 on the influence of seasons, and no more precise deductions can be drawn from the numbers of deaths occurring in the various months of the eight years in which I did my second 500 operations. For if I took the bare figures I should have to declare that the greatest numbers died in May, July, and June, there being 11, 12, and 15 deaths debited to these months respectively for all the eight years. But then it must be remembered that this quarter of the year is the time of most active work in London, that I have never quitted my post at that season, and that more cases have been sent to me then than during any other three consecutive months. February and October only can compete with them. I now speak of all the eight Mays and other months collectively, 1872–1880. In the Mays I have operated 53 times; in the Junes 52 times; and in the July months 58 times. The February operations were 52 and the October 50. The other months varied from 10 to 47. But there are holidays to be taken into account, and I have always gone away for parts of August and September, and sometimes in December and January. The actual number of deaths tells only in general that I was more or less busy and did a fluctuating number of operations. It throws no light upon the question of the fatality of the seasons.

Nor if we look at it from another point of view does it become much clearer. I give a table showing the number of the operations, with results and average mortality, as they were done in the several sets of months in the consecutive eight years.

Months	Cases	Deaths	Mortality per cent.
January	35	9	25·71
February	52	5	9·61
March	40	11	27·5
April	45	9	20
May	53	11	20·75
June	52	15	28·84
July	58	12	20·68
August	25	4	16
September	10	2	20
October	50	10	20
November	47	7	14·89
December	33	10	30·3

From this it would seem that the most favourable months are February, August, and November; that April, May, July, September, and October have an average very nearly corresponding with that of my second series; and that the greatest fatality has happened in January, March, June, and December.

The first half of the year gives a percentage of 21·66, and the second half of 20·17; the six summer months 21·02, and the six winter months 20·23. The half years, therefore, taken either as they run, dividing the seasons, or as sets of summer and winter months, may really be regarded as identical in their results. But why February and November, which are always talked of as times of unhealthiness, should stand out in such contrast with general impressions, and why, too, such months as June and December, so opposite in all their conditions, should so nearly approach each other in their death-rate, is inexplicable. If it had so turned out that my proportion of deaths was larger when I did most operations, I should perhaps have blamed myself, and fancied that multiplicity of engagements was the occasion of some oversight or carelessness; but it is not so. My smallest mortality was when there was the accumulation of 52 cases in the eight February months, and my greatest mortality when there were only 33 operations done in the same space of time, that is, in the eight Decembers.

In looking over all these figures and remarks on the conditions affecting the probable success of operations, there is this qualification to be thought of. The field of observation from which they are drawn is after all very limited. It is the experience of one man and of one locality. It is true that what happened to him may happen to others. But personality has

a great deal to do with the outcome of a man's work, and when that work, as in ovariotomy, is not single-handed, the assistance that he gets has not much less influence. As an individual I have but little changed during the twenty years, and it is both a duty and a pleasure to acknowledge that upon the whole I have been ably and conscientiously seconded.

I have done what it seemed possible to do under the circumstances; that is, I have gathered the facts together and have tested them to see whether they would yield any data for forming opinions which I might announce safely and beneficially. But, curious as is my information, strange as are the results which the calculations founded upon it present, the guidance to be gained is ambiguous because the area for collection is, relatively to the subject, too contracted; and it is not by the energy, or in the lifetime, of one man that it can be sufficiently enlarged and its products garnered. The combined action of many observers in every variety of social, territorial, climatic, and professional conditions, extending over adequate time and numbers, must be brought to bear upon the subject before we can formulate dogmatically the laws which determine the results of our operations.

But in the meanwhile the great principles which lie at the foundation of surgical science remain unchangeable. It is the patients that vary, and to such an extent, that though they may be roughly thrown into classes, the peculiarities are so great that every one must have her separate consideration. By continuous habitude in common with all professional experts, one acquires a certain power of forecasting, and in a large number of cases I feel that I can read the doom or augur well of my subject. But this is not a communicable faculty, and must be waited for. It ought not, and it does not, stand in the way of putting into practice the lesson that is to be learnt from all that has just been said—that we must deal with every case as it comes before us as if it were unique, and must concentrate attention upon the actual circumstances. We must gather up the threads of the personal history of the patient, acquaint ourselves with the peculiarities of her moral and physical condition, inform ourselves by every means of investigation of the characteristics of the local disease, surround her with every accessory that our current knowledge suggests as conducive to her safety, use every precaution

and expedient that practice and study have taught us in our operative work, and lead on to her recovery if possible by doing no mischief and meeting every complication quickly and to the best of our skill. If so, and at the same time we note all changes and accidents in external circumstances coincident with the varying progress of our patient and the ultimate result of our efforts, we may be satisfied that we have done all that humanity and professional responsibility can demand from us as practitioners, and have contributed our share to the future elucidation of the problems which lie before us and await solution at the hands of the coming generation.

CONTRA-INDICATIONS.

As a general rule, any existing disease which in its natural course would prove fatal to the patient, or would influence her constitution in such a manner as to render her recovery very unlikely, or other serious surgical operations inadmissible, should also forbid ovariotomy. It ought not to be resorted to in individuals suffering from cancer, far-advanced tuberculosis or scrofula, syphilis, important diseases of the heart, or in cases where this organ has been displaced by the tumour, and at the same time has been fixed in its abnormal site by adhesions which would retain it in its position even after the removal of the ovary; diseases of the brain and of the nervous centres, of the liver, spleen, and kidneys; ulcers of the stomach and diseases of the alimentary canal, which permanently impair general nutrition; ascites in consequence of liver complaint, of disease of the heart, or degeneration of the kidneys. Scurvy, anæmia, and other blood diseases, hectic fever, great weakness and extreme emaciation from advanced age or impaired nutrition, would lead, if not to absolute prohibition, to a very unfavourable opinion as to the probable result.

But scarcely ever will the judgment of the surgeon be so severely tested as in estimating the value and importance of many of the above-mentioned contra-indications, whether any one is by itself so serious as to preclude surgical interference, or is merely a consequence of the local disease. This may be instanced by one of my cases where all the symptoms of far-advanced tuberculosis were present—cough, hectic fever, high

temperature, and rapid pulse—which all disappeared after extirpation of the ovarian tumour. The pulse fell from 108 to 88, the temperature from 101·4° F. to its normal range; cough was no longer troublesome. It may be added that the cyst contained genuine tubercular deposits, was thin-walled, and very fragile.

The operation ought not to be performed when the tumour is in an advanced stage of cancerous degeneration. But so many instances of recovery after extirpation of what was pronounced to be cancer are well known, that there must be more than bare suspicion to set aside the operation. Cancer of the ovaries is supposed to occur most frequently after the change of life; but cases have been mentioned, in another chapter, of this disease in a young girl, and in middle-aged women. Such tumours often form extensive and intimate adhesions, infiltrate the surrounding tissues, and attack the neighbouring organs, with which they form at an advanced stage of the degeneration one confluent mass. In most cases, their extirpation, if attempted, would meet with insurmountable difficulties; and should the operation be terminated and the patient recover from it, the disease would sooner or later attack some other part or organ. Ascites generally accompanies malignant disease of the ovaries, and both ovaries are usually affected at the same time.

The presence of ascites needs not deter from the operation, provided it be due to escape of fluid from the cyst, or is brought on by the mechanical irritation of the peritoneum by the tumour. If, however, it is caused by disease of heart, liver, or kidneys, these conditions almost always forbid the operation. The complication of pregnancy with ovarian disease, and its bearing on ovariotomy, are treated of in a subsequent chapter.

CHAPTER VII.

PREPARATION OF A PATIENT FOR OVARIOTOMY; DUTIES OF THE NURSE; DESCRIPTION OF NECESSARY INSTRUMENTS.

It by no means follows that the state of robust health is one so favourable for operation, as that of a patient more or less accustomed to the quiet and habits of a sick room. A young, strong, healthy person, much of whose time is passed in open-air exercise, does not bear so well the enforced quiet of a sick room as the patient who has become gradually habituated to it. And it is perhaps one of the most difficult questions which the surgeon has to determine, whether the patient is suffering enough in general condition to warrant him in recommending an operation necessarily attended with serious risk to life, and yet not so far broken down by the progress of the disease as to lessen the chances of recovery after operation. Every case must be judged by its own peculiarities; not those only which relate to the physical condition of the patient, but the various moral, mental, and social influences which have so constantly to be considered in daily practice, and which so materially affect the results of any operation. For instance, an unmarried girl with ovarian disease is often so distressed by the suspicions which her appearance excites, that she must be relieved earlier than a married woman of the same size need be; and a girl engaged to be married, and naturally unwilling to marry as an invalid, may claim with good reason earlier aid from surgery than one not so pledged. The same would hold good with a wife wishing to travel with her husband, or to join him in some distant part of the world. On the other hand, there are family circumstances which would properly delay operation till the last possible moment. Children may be dependent on the annuity of the mother, whose life should not be subject to the additional risk of the operation until it is imperatively called

for by the severity of her sufferings. In many cases such considerations have guided me in operating either earlier or later than one would do if only obliged to regard what was best for the bodily welfare, and able altogether to ignore the affections, interests, and circumstances of patients.

One condition which certainly requires correction before the operation is undertaken, is that common one where only a small quantity of highly concentrated urine, depositing mixed urates in abundance, is passed. If ovariotomy be performed on a patient in this condition, a serious amount of kidney congestion, with symptoms almost amounting to uræmic fever, is almost certain to follow the operation. Before undertaking it, therefore, it may be necessary to gain time by tapping. Whether or no this may be necessary, warm baths or vapour baths, to promote free cutaneous secretion, something to secure a free daily action of the bowels, and some of the alkaline carbonates, largely diluted, will most likely greatly improve the condition of the patient. Nothing tends so rapidly to clear the urine a lithia. One or two bottles of lithia water—either the liquor lithiæ effervescens of the Pharmacopœia, or the lithia water of the shops, which contains five or ten grains of citrate of lithia to each bottle, or from five to ten grains of the citrate or carbonate of lithia, dissolved in a full proportion of simple or aerated water, two or three times a day, generally lead to a more abundant secretion of urine which is free from deposit. Sometimes it is a good plan to combine the carbonates of lithia, potash, and soda together, and it may be desirable to give iron at the same time. A draught of five grains of tartrate of iron, five of carbonate of lithia, and ten each of the bicarbonates of potash and soda, with a few drops of chloric ether, two or three times a day, has often appeared to me to be of great service. Simpson was strongly in favour of a course of perchloride of iron before ovariotomy, or any other serious surgical operation. He thought it so altered the condition of the blood as to make pyæmic fever or septicæmia much less liable to occur. A change to the seaside or country will, of course, assist the restorative action of medicines; and if the patient is brought from the country it may be as well to arrange for the performance of the operation at as early a period as possible, before the influences of town life have had time to prove injurious.

The place where the operation is performed ought to be healthy, and, as time is generally at our command, there can be no excuse for putting or leaving the patient in an unhealthy house or district. If she lives in a healthy part of the country and can be treated there, it would be positive cruelty to bring her to an unhealthy part of town, or to expose her to the influences of a large general hospital. Even in the same town, or in the same district of large cities, better results have been obtained in private houses and in small hospitals, where the patient occupies a room alone, than in large general hospitals, where she must share a ward with other patients, and may be subject to the influences of dissecting students. At the Samaritan Hospital, where there are seldom more than twenty and never more than thirty patients, and where every patient subjected to ovariotomy has a room and nurse to herself for a week after operation, my own results have at times shown a considerably greater mortality than in private houses; and I have found in a private nursing institution, where each patient had also a separate room, that the mortality was as great as in the Samaritan Hospital. In the fourth series of one hundred cases the mortality in private practice was only 14 per cent., while in hospital it was 31 per cent. But on the whole series of one thousand cases there is only a difference of little more than 2 per cent. in favour of cases in private practice. In the first one hundred the advantage was in favour of the hospital as much as 10 per cent., and in the fifth hundred fully 7 per cent. in favour of the private. And it is well worthy of remark that the periods of good and indifferent results in hospital have corresponded with improvements in its sanitary condition. After emptying the hospital for a month or more, and thoroughly cleansing, painting, and lime washing the wards, a period of almost uninterrupted success has followed. Then what was called 'a run of bad luck' set in, clearly attributable to crowding, some neglect in purifying bedding, or to contagion or infection. Another thorough cleansing again led to more favourable results, and in the six months from December 1871, after complete repairs, to July 1872, of twenty-four cases, only two died and twenty-two recovered. But this mortality, though larger than that in private practice now, is very much smaller than anything yet attained in any large general hospital.

If we could obtain all the favourable conditions of a room in a private house, in a healthy country situation, there can be no doubt that the mortality would be much smaller than the most favourable results hitherto attained. And the question seriously presents itself whether ovariotomy or any other surgical operation, attended with risk to life, should ever be performed in a large general hospital, in a large town, except under such circumstances as would render removal to the country or to a suburban cottage hospital more dangerous. Of late years, the extension of antiseptic treatment, especially in hospital practice, has, however, so greatly reduced hospital mortality that the opinion just expressed will probably be considerably modified in the future.

The ward or room, whether in a small hospital or in a private house, should be well provided with means for keeping up a continual and sufficient ventilation, without exposing the patient to currents of cold air, and the temperature should be regulated by an open fire. In a building specially constructed for the purpose, it would be perfectly easy to keep up a constant current of fresh air, at any temperature required, night and day; but the knowledge of the architect and the art of the builder are very far behind the scientific teaching of the day, and what is theoretically easy in warming and ventilating a house has probably never yet been done well. All unnecessary furniture should be removed from the room, particularly dusty woollen curtains and carpets. Instead of a bed with heavy draperies, two iron bedsteads should be provided, not more than three feet six inches wide, so that the patient can be reached equally well from either side, and may be lifted from one bed to the other, if desirable. A horsehair mattress is cooler and firmer than a feather bed, and therefore preferable, and one of the many forms of open iron spring bedsteads are far safer than the old sacking and wool or straw mattress under the horsehair. The covering ought to be light but warm; and no one should be allowed in the room but the patient and her nurse.

The nurse has a very important influence on the result of ovariotomy. Much depends on her scrupulously regarding all the essential precautions, and judiciously managing for the comfort and encouragement of the patient, up to the time of

the operation; and the after treatment can be altogether marred by any failure of discipline, or neglect in fulfilling every little point of the duties entrusted to her. What is especially wanted in a nurse for this kind of work is a calm, quick, decided way of doing it; an intelligent understanding of its nature; a readiness in comprehending the instructions given; punctuality and exactness in carrying them out; and a discriminating carefulness in observing and reporting all that passes under her notice, and that may be of importance to the surgeon in judging of the progress or regulating the treatment of the case.

There is at the present time a fair, free, and remunerative field for the exercise of these combined qualities, which, after all, are not so rare as might be supposed, though they develop more notably in a stratum of society where one would not, at first thought, have expected to find them. As a rule, ladies in search of an occupation for a livelihood, or who take to it because they know not what else to do, or who fall into it by sentiment or accident, seldom succeed in nursing well. There is generally a lurking sense of degradation which takes the spring out of their work, and throws over it an undefinable but appreciable air of taskiness which has its influence both upon patient and surgeon. Whereas for the most part a nurse who has changed from the business of ordinary domestic service feels that she is making a step upward in life, and goes about what she has to do with a kind of professional pride and personal interest in its success. A young woman of this class has already fallen into habits of cleanliness, order, and submission; she knows from experience in her own family the way the poor manage for themselves, and she has had opportunities of observing the wants and indulgences which slide into the list of necessaries among the luxurious. She has acquired in her calling a certain dexterity in the arranging, handling, and cleansing all the usual utensils and appliances of a sick-room, and a sort of chamber ease and conformity in her movements which only come after practice in household duties. Her mind, too, from acting habitually under orders, and in obedience to rules, and under a light weight of responsibility, has generally become pliant, receptive, responsive, and forecasting. It is comparatively easy to graft on a stock so prepared the addi-

tional qualifications required for making a good nurse, and it certainly is worth the while for any one much engaged in operations of the kind we are dealing with, to train in his own ways those whose co-operation he wants, both for his own comfort and the welfare of his patients. The passive, confiding docility of women after ovariotomy, who find themselves subject to the good understanding which exists between a competent nurse and the surgeon she is serving under, is in marked contrast with the keen, anxious watchfulness and feverish fidgetiness of others less fortunate in their attendants, and their progress towards convalescence is promoted or retarded in such a way as to make very clear how much the style of nursing has to do with it.

No nurse should be entrusted with the care of a patient after ovariotomy unless she is well able to use the female catheter without uncovering the body and exposing it to chill. She should use the catheter every six or eight hours, or as much oftener as the patient may wish, and should preserve the urine, but not in the sick-room, for the examination of the surgeon. She should also be well practised in clearing the rectum by injections, and expert in giving medicine or food by it when necessary. She should know the danger of bed-sores, and the mode of avoiding them. She should understand the importance of thoroughly cleansing and freeing from every particle of sand, and deodorizing or disinfecting, every sponge which is to be used during or after the operation, and on any day of operation she should have at least twenty soft sponges, when moist about the size of the double fist, not quite but nearly dry, before the arrival of the surgeon. Here, however, I should say that very few nurses can be entrusted with this duty, and I always see myself that the sponges are as pure as they possibly can be made before every operation. She should also have prepared several slips of adhesive plaster, about two inches broad, and long enough to more than half encircle the body; a supply of lint thymol or iodoform gauze, and some small muslin bags filled with phenolized or boracic cotton-wool. An india-rubber bag filled with hot water should be ready for use; a flannel belt to pin round the body, and some large safety pins to fasten it. Some brandy, one or two pint bottles of champagne, and some ice, must be entrusted to her care; and

a small enema bottle, holding an ounce, with an elastic tube, a minim measure and some laudanum should be provided, so that in case of pain a dose of it may be injected into the rectum. A feeding-cup is also wanted, so that barley-water, beef-tea, soda-water, with or without milk, may be given without the patient rising.

The temperature of the room need not be so high as was formerly supposed indispensable, nor need any attempt be made to charge the atmosphere with moisture. In the first paper on five cases of ovariotomy which I brought before the Medical and Chirurgical Society, I already expressed my belief that many of the symptoms, supposed to be caused by the operation, were in reality due to the confinement of the patient in a hot, close room filled with watery vapour, and showed that both patient and surgeon were very much more comfortable in an ordinary atmosphere. Perhaps the temperature of the room should not be below 65° Fahrenheit, but it need not be raised to an uncomfortable degree above this point. The patient should wear her ordinary night-dress, warm woollen stockings, and a loose, short flannel dressing-jacket. Anything tight round the neck or body should be removed. Even if the bowels have acted on the morning of the day selected for operation, the rectum should be thoroughly cleared out by an injection of warm water. She should not eat anything for four hours before the anæsthetic is administered, and a little good beef-tea, with dry toast, will be enough for the morning meal. I find about two or three in the afternoon a better time for operating than an early morning hour. A patient who expects to undergo an operation early in the morning seldom sleeps well, or she awakes wearied and depressed ; but if she is to get up to breakfast, and does not expect her fate to be decided till the afternoon, she sleeps better, and there is time for clearing the bowels after breakfast. If she has had a warm bath the night before, her skin is in a better state for perspiring, and the abdomen should be thoroughly cleansed by soap and water. It is always well to know the morning and evening temperature of a patient two or three days before operation, and it is very important that the nurse should be properly instructed in the use of the clinical registering thermometer.

Tables on which the patient is to lie for the operation, and

another table for the instruments, should be placed opposite a window admitting a good light, with foot-pans or pails beneath for the reception of the fluid. The nurse should have a good fire in the room, a plentiful supply of hot and cold water, and ought to see that everything is in such readiness that, after the patient is in the room, it may not be necessary to send for anything, or to open the door. With some few unusually nervous patients it may be desirable to administer the anæsthetic in another room, or in bed in the same room, before she is placed on the table; but, as a rule, as soon as they have emptied the bladder, patients may generally walk to the table and arrange themselves upon it, with some little assistance, in the position desired by the surgeon. The night-gown should be pressed up towards the shoulders. In order to have as few assistants as possible, a broad strap should be carried over the patient's knees, and around the table, and tightly fastened. The hands should also be securely fixed by a bandage to a leg of the table on each side. The head should be laid in a comfortable position on pillows; and, except the abdomen and face, the whole body should be covered with warm, light blankets or flannel. The abdomen should be covered by a waterproof sheet, with an opening about eight inches long and six inches wide in the middle; the inner surface spread with a coating of adhesive plaster of about an inch in width all round the opening, so that it may adhere to the skin, and prevent any exposure of the patient, while her body and clothing are kept perfectly dry and clean.

The next drawing shows how I am now in the habit of arranging two ordinary tables near the window, with the patient covered upon them; the table for the instruments being to the right hand of the operator, and the steam spray apparatus near the feet of the patient to her left placed upon another table—always supposing the surgeon uses the spray.

The necessary instruments for a simple case of ovariotomy are extremely few: a scalpel, to divide the abdominal wall; a director, to protect the cyst as this division is completed; a trocar, to empty the cyst; needles and silk, to secure the pedicle and close the wound; with forceps and ligatures, to secure any bleeding vessels, complete the list. But there is, perhaps, no surgical operation where the surgeon may be so met by difficulties where he least expected them, and it so

often happens that instruments are wanted which would not be at hand if only the instruments required for an ordinary case were taken, that it is a safe rule to take to every case a full supply of instruments, to meet every possible emergency. Cautery clamps and cauteries for cases where the cautery is applicable, ligatures and needles of different shapes and sizes for cases where neither clamp nor cautery is used, pressure forceps for temporarily securing separated omentum or torn vascular adhesions, and for securing arteries by ligature or torsion, vulsella specially adapted for holding large cysts, a chain and wire écraseur, drainage tubes of glass, vulcanite, or india-rubber, and perchloride of iron should always accompany the surgeon. Only the instruments which the operator thinks likely to be required need to be arranged on the table to his right; all others in reserve should be placed ready for use in a drawer, or on a tray, out of the way, but close at hand. All this having been done, and the table with the instruments covered with a towel, the light subdued, and no other person present than the operator, the administrator of the anæsthetic, and the nurse, the patient may be brought into the room.

Before proceeding to describe the various steps of the operation, a few lines may be given to the consideration of the anæsthetic, and to an account of the most important instruments which I use.

In all my earlier operations chloroform was the anæsthetic given. Vomiting following the operation so speedily, and continuing, just as after other operations, with the distressing persistency known as 'chloroform sickness,' was very frequently observed, in some cases led to great danger, and even became a principal cause of fatal results. I tried sulphuric ether; but the large quantity necessary, the diffusion of the vapour throughout the room, the irritating cough it produced, and the difficulty of inducing complete anæsthesia by it, induced me to search for a better anæsthetic. I tried a mixture of chloroform and ether in different proportions, but soon became aware that the patient was at first only affected by the lighter vapour of the ether, and was then subjected to the action of chloroform just as she was least able to bear it. The addition of alcohol to the ether and chloroform made a mixture which given by Mr. Robert Ellis with the apparatus he devised,

appeared to answer better; and I was trying this triple combination when Dr. Richardson brought his experiments with the bichloride of methylene before the profession.

An impression has prevailed that, while bichloride of methylene may be usefully employed in operations on the eyes, it is not an agent of very extensive utility, nor likely to supersede the use of chloroform in general surgery. And I have seen and heard several statements to the effect that, like nitrous oxide gas, the bichloride of methylene—or chloromethyl, as it may be more conveniently called—is only useful for short operations, and that it cannot be safely administered for more than one or two minutes. But as my experience would show that this commonly expressed opinion is the very reverse of the truth, it seems to be my duty to make known what I have seen of the use of chloromethyl in general surgery.

The first surgical operation in which chloromethyl was ever used was a case of ovariotomy, which I performed in October 1867. It was administered by Dr. Richardson himself; and in his report to the British Association in 1868, he says: 'After subjecting myself to the action of the vapour to the production of perfect insensibility, I ventured to administer it for surgical purposes on October 15 last. The sleep produced was of the simplest and gentlest character, and the operation performed by Mr. Spencer Wells, which lasted thirty-five minutes, was quite painless.'

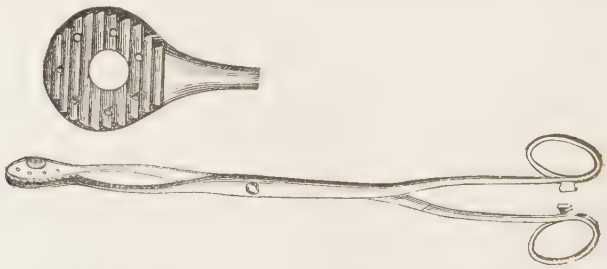
This was my 229th case of ovariotomy. I have now done ovariotomy more than one thousand and sixty times; and, with the exception of about ten, where, for some reason or other, chloroform was used, chloromethyl was the anæsthetic employed in every case, about 840 in number. In some 100 other cases of gastrotomy, and in more than 300 operations of more or less severity—such as herniotomy, amputation of the breast, removal of mammary or other tumours, or of hæmorrhoids, and plastic operations for the cure of vaginal fistula or ruptured perineum —chloromethyl has been administered for me, either by Dr. Richardson himself or by my colleagues, Dr. Junker and Dr. Day. In very few of these operations was the condition of insensibility to pain maintained for less than five minutes. In a few, it was kept up from forty-five minutes to an hour or more; and I should think the average would be about fifteen

minutes. Yet I have never been at all uneasy in any one of these cases, about 1,500 in number, either during the administration of the anæsthetic or from any subsequent ill-effects fairly referable to it. Whereas, with chloroform I never felt quite at ease; and, although I never lost a patient during operation, I have three times had to resort to artificial respiration, and I have very often seen patients suffer so much from chloroform-vomiting for many hours after operation, that the result has been imperilled. And in some cases death has been in a great measure due to the vomiting. It is quite true that chloromethyl is not quite free from 'the disadvantage of causing nausea and occasional sickness;' but, in my experience, this is almost the rule with chloroform, whereas with chloromethyl it is certainly exceptional. I think after this evidence it must be admitted (as anæsthesia was complete in every case, not one patient having been conscious at any stage of the operation) that the anæsthetic employed is a good one. In some cases less than two drachms was used, and very rarely more than six drachms. Dr. Junker's apparatus was generally employed; and Mr. Krohne tells me that many practitioners on the Continent, in America, and in different parts of our own country, who have ordered it from him after seeing it in my practice, have used it without difficulty, and have been well pleased with the results. A patient may be kept in a state of perfect unconsciousness throughout a prolonged operation with methylene administered by the apparatus devised by Dr. Junker. Scarcely any of the vapour escapes into the room; neither the surgeon nor the assistants are affected by it; a patient very seldom becomes pale, she sleeps quietly, awakes quietly, is not often sick, and seldom has much bronchial irritation referable to the chloromethyl. Indeed, she gains all the advantages of complete anæsthesia with fewer drawbacks than by the use of any other anæsthetic.

The trocar used in ovariotomy by all the earlier operators was an ordinary trocar of full size. When Mr. Thompson's instrument came into use for ordinary tapping, I had one enlarged and lengthened for ovariotomy; and when I had learned the advantages of the syphon trocar, which has been described in the chapter on Tapping, I also enlarged this for use in ovariotomy. Then, finding that the cyst was apt to slip off the trocar, or that the fluid would escape between the perforation

in the cyst and the canula, I had roughened rings adapted to the canula, so that the cyst might be securely tied, fixing it to the canula, preventing the escape of fluid, and serving as an aid in drawing out the cyst. This occupying too much time, I had two spring handles, each furnished with a series of hooks, adjusted outside the canula, by which the emptying cyst could be immediately fastened to the canula; and this instrument, now sufficiently well known and described as my ovariotomy trocar, I have used for several years past, and have been well satisfied with it.

In 1871, Dr. Fitch, of Portland, in the United States, showed me a modification of the instrument, which appears to be an improvement. Instead of the inner tube having a cutting point, which for protection is withdrawn into the outer tube or canula, as soon as the cyst has been perforated, Dr. Fitch made the outer tube cutting, and protected it by pushing the inner tube forward. He also lengthened and curved the end of the canula upon which the tube is fixed, with the object of gaining a sort of pistol handle, rendering the instrument more manageable, and enabling us to use an ordinary india-rubber tube, without fear of stopping the current by its bending. This instrument is very well made by Krohne. Whether my old ovariotomy trocar or the instrument with this modification of Dr. Fitch's be used, a cyst is punctured, when partly empty is fixed on to the canula by the spring hooks, so that trocar, ligature, and vulsellum are united in one instrument, and a large cyst may be rapidly emptied and readily withdrawn, without any fear of its contents escaping either into the abdominal cavity or about the patient.



As aids to the hooked trocar in drawing out a cyst, or in holding a cyst which has been opened outside the abdominal

cavity, while the septa of inner cysts are being broken up and the contents brought out, hooked forceps, or vulsella of different kinds, are often necessary. The best of these instruments is that sold by many makers, and known as Nélaton's vulsellum. It holds the cyst very securely, does not slip nor tear the cyst. The essential or grasping part of the instrument is shown in the last drawing.

The clamp which is used for temporary compression of the pedicle when we intend to trust to the cautery for stopping bleeding from the divided vessels of the pedicle, is known as the Cautery Clamp. The original instrument was devised by Mr. Clay, of Birmingham, in order to stop bleeding from vessels in the omentum, which had been adherent to and separated from the cyst. It is to him we are indebted for the principle of combining compression and cauterization in the suppression of hæmorrhage. The cautery clamp not only securely holds the pedicle, but so firmly compresses the portion included within he blades, that alone it would be almost sufficient to control he bleeding from any vessels not large; but when the divided dge of the pedicle is seared by the actual cautery, the effect f compression is assisted by the line of eschar or plugging ormed at the cauterized part; and the blades of the clamp bing necessarily heated during the application of the cautery, te compressed part of the pedicle is also heated, the blood in i vessels is coagulated, and when the clamp is removed, if this ls been done carefully, and the compressed and heated tissues a: not disturbed, a thin band almost like wash-leather, with th seared edge, becomes a very efficient safeguard against beding. Soon after Mr. Clay described the successful applicaion of his cautery clamp in suppressing bleeding from torn aesions and separated omentum, Mr. Baker Brown was the fi: to apply it to the pedicle. He improved the instrument bmaking it broader, by adding a guard to prevent slipping of tl cautery, and an ivory shield to protect the soft parts from tl action of the heated clamp. His results were so successful th I tried the method; and, after a case or two, curved the hdles, altered the joint, substituted a better non-conductor fcivory, and used the galvanic cautery and the gas cautery, iread of the common irons. The only improvement upon tl instrument which I have seen is one by the late Dr.

Sköldberg, of Stockholm, which makes the action of the blades more parallel. Pratt carried out the same idea for me many years ago, and Dr. Braxton Hicks had also contrived a parallel bladed cautery clamp, which I used with fair success; but Dr. Keith, after many trials, found the original instrument of Baker Brown to be the best.

The cauterizing irons used by Mr. Baker Brown were the ordinary conical irons, with a sharp edge, used in firing joints.

With these instruments made red hot in the fire, he divided te pedicle, as shown in this cut, the tumour being held up by a assistant. This was a tedious and troublesome process; and found that the same end was attained by cutting away the ct half an inch or so from the clamp, and then burning away l the tissue that projected beyond the surface of the clamp. Ht irons answered this purpose better than the conical ones; d nothing answers better than the common spatulas used y druggists in spreading plasters. The galvanic cautery answs equally well, and, when it is inconvenient to have a fire in e room, would be generally preferred, if it were possible alws to secure efficient battery action; but as this is uncertain, e

gas cautery of Nélaton, either simple, or with the addition of the blow-pipe and the platinum capsules devised by the late Mr. Alexander Bruce, answers equally well; and Meyer once made for me a platinum cautery, with a spirit lamp to heat it, which was also as satisfactory in its action as the hot irons. Since the introduction of Paquelin's cautery, this has been generally employed, but Dr. Keith adheres to the original form of conical iron heated in the fire. I believe it is of very little consequence which of the cauteries is used, provided the clamp exerts sufficient compressing force, and time is taken to cauterize slowly, so that the pedicle is subjected to the somewhat prolonged influence of heat.

The ordinary chain écraseur has been used several times successfully in dividing the pedicle. I believe I was the first to adopt this practice, but although the case proved successful, I was so fearful of secondary bleeding that I have never repeated the experiment. When the écraseur is used, not to divide the pedicle but simply to secure it as a kind of clamp, the chain with a nut and screw is made so that it can be removed from the handles and left upon the abdomen just like a clamp. I once tried wire-rope in this way, instead of a chain, but found it so difficult to fasten it tight enough without cutting that I gave up its use altogether.

In Chapter I. some remarks may be found upon the rotation of ovarian tumours and the twisting of the pedicle, and I have already alluded to cases which have occurred in my own practice where, long before the operation, the pedicle had given way and the cyst had received its whole blood supply through omental vessels. There can be no question, therefore, as to the feasibility of tearing through a pedicle, or of twisting off an ovarian tumour. Maisonneuve was the first actually to practise this twisting in ovariotomy; he twisted the cyst round and round until the pedicle gave way. Macleod, of Glasgow, has improved upon this practice, and Hilliard, the Glasgow surgical instrument maker, has modified some of the instruments used by veterinary surgeons in castration, in order to hold the pedicle securely with one hand while the cyst is held and twisted with the other. Macleod has had one successful case, and his example has been followed with good results in Leeds. It is possible that there may be cases where this method may

be preferable to the ligature or the cautery, but I can say nothing on this point from personal experience.

As it is never improbable, by whatever intra-peritoneal method the pedicle may have been secured, that bleeding vessels low down in the pelvis may have to be found and secured where, the patient lying opposite the light, the pelvis is necessarily in deep shadow, the surgeon should always be provided with a hand mirror to reflect light to the bottom of the pelvis. On a clear day this gives quite light enough, but in any foggy, dark, or cloudy weather, or when operating late in the day, a candle lamp, with a reflecting concave mirror, often becomes very serviceable. Collin's lamp is handy, but too small. A policeman's 'bull's-eye,' or a good carriage lamp, is generally to be had, and it is to be hoped that by Faure's storage battery a good reflected electric light may be conveniently obtained.

With regard to the other instruments, it can only be necessary to repeat, that the surgeon should be prepared with scalpels, a probe-pointed bistoury, a broad Key's director, fine strong pure ligature silk, straight needles, forceps, and scissors.

The forceps most useful as temporary suppressors of hæmorrhage are those sold as my torsion or pressure forceps. The ordinary 'bull-dogs' are too small, and, if used, should have a long piece of wire or silk attached to them as a safeguard against their accidental entry into the peritoneal cavity; but I have for many years used forceps with long handles, which answer all the purposes of 'bull-dogs,' as well as of artery and torsion forceps. Mathieu's catch at the handles serves instantaneously to fix the instrument, and the short, roughened points hold a vessel very securely, stop bleeding completely, and enable the surgeon to twist the vessel if he wishes. These forceps are well made by Krohne and Hawksley.

The forceps of Péan, as well as Kœberlé's, may be either curved or angular. But they all, like Kœberlé's, have the great disadvantage of an open space between the blades, which admits of entanglement of one instrument with another, or of the passage of omentum or other structures. This was a fault in my own earlier instruments. It has been completely corrected in the later instruments made for me by Mr. Hawksley, without at all lessening the compressing power exerted on the vessel.

In October 1878 Mr. Hawksley carefully tested the compressing power of different forceps when opened by a piece of leather one millimètre thick between the jaws of the forceps, and covering about four teeth from the points. The following table gives the result :—

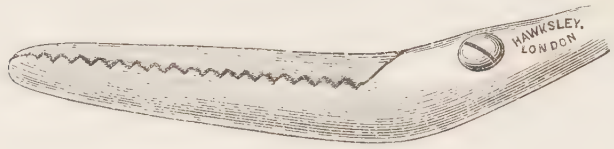
Pounds avoirdupois exerted by four teeth of the end of forceps when one millimètre apart.

Forceps	First catch	Second catch
Kœberlé	—	$3\frac{1}{4}$
Péan	8	12
S. Wells (old) . . .	18	—
„ (new) . . .	5–7	15–17

It may be seen that in my old instrument there is only one catch, and in my new one, the second catch only exerts the

same power as the first catch of the old instrument. But this is five times greater than the second catch in Kœberlé's, and one-third more than that of Péan's. When only the first catch in Kœberlé's instrument is closed, the points are separated about half a centimètre, so that they only compress anything more than that thickness. I have used all these instruments, but find them much less handy than my own, in which the handles meet without leaving any opening between them. The rings do not admit the thumb and finger too far; and the end which compresses the vessel is so bevelled, that, if it be desirable to apply a ligature, the silk will easily slip over the forceps, and not tie them together. Thus my instrument is not only useful in forcipressure and in torsion, but enables the surgeon to dispense with any other kind of artery-forceps if he wish to apply a ligature.

The distal end of the larger forceps made upon the same principle which I use for holding the pedicle in ovariotomy, or



any mass of tissue in other operations where the temporary command of bleeding or oozing vessels is urgent, is here represented of its ordinary size; and the pressure in use is ascertained to be in pounds avoirdupois:—

Large forceps—1½ in. fulcrum—object 1 millimètre:—

First catch	Second catch	Third catch	Fourth catch
20·10	32·8	47·8	60·0

All these instruments are placed on a table near the feet of the patient and the right hand of the operator, in shallow dishes, or soup plates, filled with a 2 per cent. solution of phenol. The smaller forceps are more conveniently arranged in upright trays, to which they are returned immediately after use, and must be carefully counted before the abdomen is closed.

CHAPTER VIII.

THE OPERATION OF OVARIOTOMY; DIVISION OF THE ABDOMINAL WALL; SITUATION AND LENGTH OF INCISION; SEPARATION OF THE CYST; EMPTYING AND REMOVAL.

We shall now suppose that the instruments have all been placed where the surgeon can reach them without moving from his post; that the patient has been placed on the table, secured there by the thigh strap and the wristbands, covered by the adhesive waterproof sheet, and brought under the complete influence of the anæsthetic. The surgeon, standing on the right side of the patient, with his right hand towards the light, has one assistant on his left hand, and another facing him on the left of the patient. Nurses, with sponges and the different necessary articles already enumerated, are also behind and to the left of the patient, while the administrator of the anæsthetic stands at her head. All is now ready for the first step of the operation, namely—

THE INCISION OF THE ABDOMINAL WALL.

We have now to consider the situation and length of the incision.

In all my cases the linea alba has been selected as the seat of incision (as shown on the next page), and in a very large majority of the cases on record other operators have selected the same situation. But in some few cases the incision has been intentionally carried either to the right or left of this line. One of the lineæ semilunares has been occasionally, though very rarely, selected; and in some few exceptional cases oblique or transverse incisions have been made. Thus Dr. Atlee in one successful case made an incision seventeen inches long, from the symphysis pubis to the middle of the crest of the right ilium. Bühring made an incision at the outer border of the

external oblique on the right side from the false ribs to the crest of the ilium.

In one of the earliest cases in England, Mr. King made

one vertical incision, seven or eight inches long, to the right of the umbilicus, and another four inches long at right angles, extending towards the spine. In this case no tumour could be found, and the patient recovered. In another case he made 'a division of about three inches through the integument and the linea semilunaris of the left side, a little above a line drawn across the abdomen from the umbilicus.'

An incision nine inches long was made by Dr. Mercier, from the 'lower ribs to external edge of rectus muscle.'

Dr. Haartmann made an incision, five inches long, parallel with Poupart's ligament; and Dr. Dorsey made a vertical incision eight inches long, by a transverse incision in the left side six inches long. These are the principal examples on record of oblique or transverse incisions. Vertical incisions to one or other side of the linea alba have been less uncommon.

Dr. McDowell, in his first and second cases, made his incisions nine inches long, three inches from and parallel to the left rectus. In his subsequent cases he seems to have selected the linea alba.

Some writers, as Hamilton, who describes his incision as 'corresponding to the inner margin of the right rectus,' merely

express in other words division of the linea alba. The object is to avoid either of the recti muscles. The only operator, so far as I know, who prefers division of one of the muscles, is Dr. Storer, of Boston, who says, 'I differ from most operators in that I prefer making the section in the track of a rectus muscle rather than in the linea alba, being thus much more certain, from the nature of the tissue divided, of a primary reunion.'

As I do not believe it possible that a divided and reunited muscle, even when most complete union results, can form so firm, unyielding, and perfect a portion of the abdominal wall as the uninjured muscle in its normal state—as I do not think that division of the muscle can make union of the skin, peritoneum, or cellular tissue more certain or complete—and as I never once saw any want of union when the recti had been carefully avoided, I always endeavour to divide the linea alba accurately, without opening the sheath of either rectus.

It is not often easy to do this, for the weight of the tumour has generally either drawn the recti to one side, or the muscles have been spread out over the anterior surface of the cyst. *Anatomically*, it appears a matter of some importance not to open the sheath; but although it is well to try to hit the linea alba exactly, it does not appear of much importance *surgically* if one edge of the muscle be exposed, or if a division be made through the muscle parallel with the course of its fibres. If the incision be extended above the umbilicus, it is better to carry it round to the left side, because the round ligament of the liver passes diagonally upwards and backwards towards the right side, and might be wounded if the incision were carried either directly through the umbilicus or to the right side. In some cases a wound of the round ligament might not be of consequence, but in others it might lead to serious hæmorrhage, as the embryonal umbilical vein is not always entirely obliterated, but remains patent, and is sometimes of considerable size.

When the linea alba is chosen for the incision the following structures are successively divided:—

1. The skin.

2. The subcutaneous areolar tissue, with fat of varying thickness.

3. The interlaced fibres of the aponeuroses of the abdominal muscles constituting the linea alba.

4. Layers of the fascia transversalis with more or less fat. The uppermost layer adheres closely to the linea alba. The deepest layer is only very loosely connected with the peritoneum.

5. The peritoneum.

But this normal arrangement is often much modified. When there is much œdema of the abdominal wall the different layers may be widely separated, and appear as if increased in number, or they may be agglutinated together by previous inflammatory processes; and, as before mentioned, the recti muscles are often carried so much to one side by the tumour that it is almost impossible to avoid exposure or division of some of their fibres.

The anatomical question may, perhaps, be studied by the assistance of the accompanying diagrams, which show the structures necessarily divided if the abdominal wall be cut through—

1. Along the linea alba.
2. Through one of the recti muscles, and
3. Along one of the lineæ semilunares.

The effect of division in the upper and lower part of the linea alba is also shown.

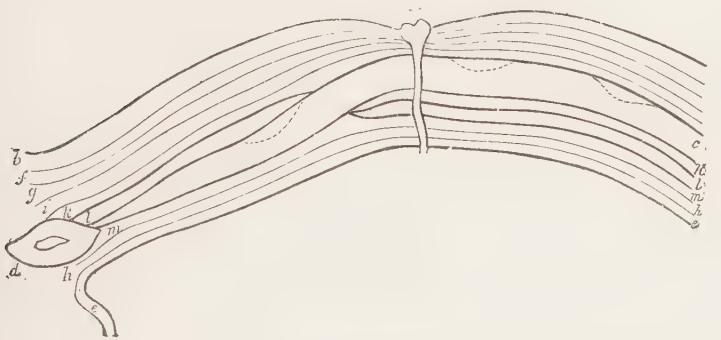
Let diagram No. 1 represent the layers just enumerated as divided, when an incision is made through the anterior abdominal wall at the linea alba.

No. 1.

a. Umbilicus.
b. Skin.
c. Linea alba.
d. Symphysis.
e. Peritoneum.
f. Superficial layer of areolar tissue.
g. Deep layer of areolar tissue.
h. Areolar tissue rich in fat, or perimysium internum.

The following diagram (No. 2) will then show how many additional layers must be divided if the incision be carried on either side of the linea alba through one of the recti muscles.

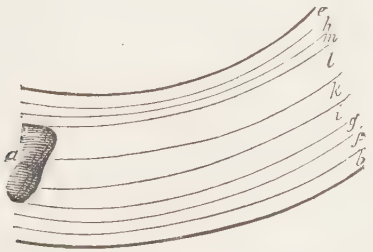
No. 2.



a. Umbilicus.
b. Skin.
c. The rectus muscle with its inscriptiones tendineæ.
d. Symphysis pubis.
e. Peritoneum.
f. Superficial layer of areolar tissue.
g. Deep layer of areolar tissue.
h. Perimysium internum.
i. Aponeurosis of external oblique muscle.
k. Aponeurosis of internal oblique muscle.
l. Aponeurosis of transversalis muscle.
m. Fascia transversalis.

The diagram No. 3 shows the layers divided if the incision be made along one of the lineæ semilunares.

No. 3.



a. Crest of the ilium.
b. Skin.
e. Peritoneum.
f. Superficial layer of areolar tissue.
g. Fascia superficialis.
h. Perimysium internum.
i. Aponeurosis of external oblique muscle.
k. Aponeurosis of internal oblique muscle.
l. Aponeurosis of the transversalis muscle.
m. Fascia transversalis.

Each of the structures which make up the anterior abdominal wall, and are arranged in the layers represented in the preceding diagrams, are of some interest to the surgeon who performs ovariotomy.

1. *The integument* is thinner and more sensitive between the sternum and the umbilicus than in other regions. Around the umbilicus it is not movable, being firmly connected with the aponeurotic ring by cellular tissue which contains no fat. But when fluid, ovarian or ascitic, is free in the peritoneal cavity, it often passes through the ring, and distends the integuments into the semblance of an umbilical hernia. Below the umbilicus the integument is very often found œdematous, and any lineæ albicantes present then become very prominent; this condition does not seem to interfere with union of the incision by first intention.

2. *The subcutaneous areolar tissue* in some parts of the abdominal wall presents two distinct and separate layers. The superficial layer is rich in fat-cells, and contains the superficial blood-vessels. The deeper layer has more the character of a fibrous fascia, and is the proper fascia superficialis. This separation is most apparent in the hypogastric and inguinal regions, and is more easily demonstrated in old than in young persons. Of the blood-vessels which ramify in the cellular tissue, only the external epigastric artery and vein are of practical interest. The artery, or some of its larger branches, are more likely to be divided when the incision is along one of the lineæ semilunares, or through one of the recti muscles, than when the linea alba is divided. But it can be readily tied before the peritoneum is opened. The external epigastric veins are frequently enlarged or varicose when tumours obstruct the current of blood along the inferior vena cava. In some rare cases a subcutaneous vein communicates through the umbilical ring with the pervious umbilical vein. A slight deviation in the line of incision will often enable the surgeon to avoid enlarged veins; and if this cannot be done, it is advisable to stop the current of blood through the vein before it is divided, by pressure forceps. In this way, what might be otherwise a serious loss of blood, is prevented. It is not often necessary to use a ligature after the forceps are removed.

3. *The sheaths of the recti*, complete anteriorly, incomplete

posteriorly from about two inches below the umbilicus, formed by the aponeuroses of the flat abdominal muscles, and terminating in the linea alba, hardly require more than a passing mention. But if much disturbed during the first incision, abscess is very likely to delay healing.

4. *The recti and pyramidales* muscles are almost always seen, and one or other may or may not be divided in ovariotomy. When the recti are unusually broad near the pubes, the pyramidales may be absent. When the recti are narrow below, the pyramidales lying in front of the recti, and inclosed in the sheath, are inserted into the inner border of the sheath, half-way between the pubes and the umbilicus, or even higher.

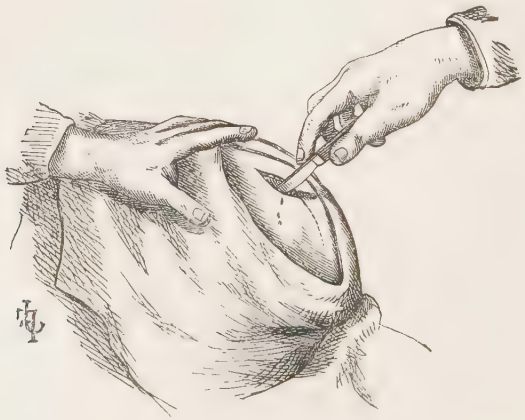
5. The fibres of the flat abdominal muscles cross each other in different directions, embrace the recti muscles, and conjoin on the linea alba, forming a tendinous band, which is very strong at the pubic end, and broader and weaker at the sternal end. The fibres of the aponeurosis on one side continue across the linea alba, and interlace with fibres coming from the opposite side, forming meshes which in the normal state are very small, only giving passage to nerves and vessels; but which, after great distension of the abdominal wall, form apertures through which small masses of fat may escape from beneath, forming what have been called Herniæ adiposæ, and often leading an inexperienced ovariotomist to think that he has opened the peritoneal cavity, and exposed the omentum.

6. The *umbilicus* is merely one of these openings in the linea alba; but the occasional permeability of the embryonal umbilical vein (already referred to) must be borne in mind, and the fact that the urachus may also remain permeable, and urine escape from the bladder through it at the umbilicus. I have never seen this in the adult; but in one case of ovariotomy I found the urachus, though closed at both ends, open for the whole length of my incision in the abdominal wall, and filled by small urinary concretions. Usually it is obliterated, and forms the vesico-umbilical ligament running up along the linea alba from the bladder to the umbilicus.

7. The *deep fascia*, or the layer of areolar tissue between the inner surface of the transversalis muscle and the peritoneum, or rather between the fascia transversalis and the perito-

neum, is very elastic, and only loosely adherent, so that it is easy to separate the peritoneum to a considerable extent without opening it. Indeed, if fluid be free in the peritoneal cavity, the membrane bulges up, like a bluish thin-walled cyst, as soon as the deep fascia is divided.

8. The *peritoneum.* It must be remembered that the obliterated umbilical vessels and urachus, passing from the fundus of the bladder to the umbilicus, are enclosed in a fold of the parietal peritoneum. The inferior epigastric artery, ascending obliquely from Poupart's ligament to the posterior surface of the rectus muscle, is enclosed in a similar but less prominent fold. The fold from the umbilicus forming the suspensory ligament of the liver has been already alluded to. It is with the later steps of the operation of ovariotomy that the peritoneum and its reflections have the most important relations. In connection with the first incision it is only necessary to add that it must be useless to carry this incision nearer to the symphysis pubis than the reflection of the peritoneum from the anterior abdominal wall to the bladder; and it is a safe rule to stop short of this point, and not carry the lowest point of the incision nearer than two inches to the symphysis pubis.



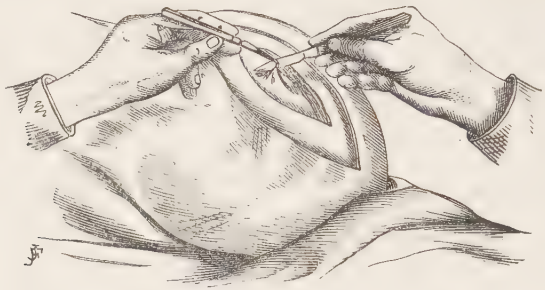
As a rule, the abdomen is tense, and the incision is made with an ordinary scalpel held in the first position, as shown in this drawing. If the operation is performed soon after tapping, and the abdominal walls are very lax, it is convenient to mark

the exact line and extent of the incision intended to be made with ink or chalk, and then, holding up a fold of integument, to transfix with rather a long bistoury, and complete the incision of the skin with one stroke of the knife. The linea alba and any fat behind the recti muscles may then be carefully divided in the usual way, until the peritoneum is reached.

If there is any fluid free in the peritoneal cavity, the peritoneum bulges into the deep gap made by the incision, looking very like a dark thin-walled cyst, and it has often been mistaken for a cyst; extensive separation has been made of supposed adhesions, while the operator was really stripping the peritoneum from the abdominal wall. When the peritoneum bulges as just described, it should always be opened, and the fluid allowed to escape, which with the waterproof apron may be done without wetting the patient or its running over the floor, if the sheet is so held as to direct the fluid into the foot-pan under the table. Even if the bulging membrane were not the peritoneum, but a thin-walled adherent cyst, no harm could be done by this puncture, as it is certainly a good plan to empty the cyst before separating the adhesions. When there is no fluid free in the peritoneal cavity, and an ovarian cyst is free, it is necessary to divide the peritoneum very carefully, or the cyst might be punctured and its contents discharged into the peritoneal cavity. The peritoneum should be raised with a hook or forceps, the double sharp hook of Mr. Adams answering

the purpose perhaps better than any other instrument. The membrane is then divided by one or two horizontal touches of the knife, as shown in the next drawing, and an opening made large enough to admit the insertion of a broad director. The instrument known as Key's hernia director is that which I have always used. The end is rounded in imitation of a finger-nail; the groove does not extend within half an inch of the point, and thus far greater safety from the danger of wounding overlapping intestine is attained than by the use of the ordinary narrow directors, where the groove runs quite to the end. Upon this director a blunt-pointed bistoury is passed, and the

peritoneum divided to the full extent of the incision in the skin.



The following table shows the result of different lengths of incision in one thousand cases:—

RESULTS FOLLOWING DIFFERENT LENGTHS OF INCISION.

First five hundred.

	Cases	Recoveries	Deaths	Mortality per cent.
Not exceeding 6 inches . .	440	337	103	23·4
Exceeding 6 inches . . .	60	36	24	40

Second five hundred.

	Cases	Recoveries	Deaths	Mortality per cent.
Not exceeding 6 inches . .	489	388	101	20·65
Exceeding 6 inches . . .	11	7	4	36·36

The whole thousand.

	Cases	Recoveries	Deaths	Mortality per cent.
Not exceeding 6 inches . .	929	725	204	21·95
Exceeding 6 inches . . .	71	43	28	39·43

Cases exceeding 7 inches in length.

Inches	Cases	Recoveries	Deaths	Mortality per cent.
7	35	21	14	40
8	23	16	7	30·43
9	9	5	4	44·44
10	3	1	2	66·66
20	1	0	1	100
	71	43	28	39·43

In all three of the tables of my thousand operations setting forth the results following different lengths of incision—those of the first 500 cases, those of the second 500, and those of the entire group—there will be found the same difference of

about 17 per cent. of deaths between the long incisions and the short incisions, so that from first to last the same conditions have been influencing the mortality. The extent of the incision, however, is little else than an indication of the gravity of the case, as it cannot be supposed that two or three inches more or less of simple division of the parietes of the abdomen would augment the danger to this amount. But while it shows that the case is serious from the size of the tumour, some peculiarity of its position, or the character of the adhesions, it proves, on the other hand, that the surgeon is cautiously facing the extra call upon his skill, and is seeking to avoid the additional risk of working in the dark, of being obliged to resort to undue force in extraction, of causing contusion or laceration, and is gaining the advantage of greater control over any hæmorrhage that may happen and facility in the toilette of the peritoneum.

The direct mortality of these long incisions has not exceeded 39·43 per cent., while that of the incomplete cases went up to 43. Here I am speaking of 'incomplete cases' as those where incomplete removal of a tumour has been the characteristic feature of the case. In a mere exploratory incision the mortality is almost *nil*. The venture of the 'major operation' with an incision of from seven to twenty inches in length somewhat counterbalances the difficulties which are to be encountered, and at any rate gives the patient the benefit of some $3\frac{1}{2}$ per cent. less risk than she would have to bear with an abandoned attempt. Nor must we overlook the fact that the survivors of this operative peril of 43 per cent., if sometimes relieved from the distress of certain symptoms, are left to the misery of their disappointed hopes, and in almost all instances to a lingering but certain death. In contrast to this fatality one has the satisfaction of being able to point out rather more than three-fifths of the long incision cases with life prolonged and health and vitality restored.

Any large group of ovarian tumours may be ranged in these four categories: 1. Those in which a simple operation has a well-known happy result. 2. Those in which the major operation gives a three to two chance of renewed life. 3. Those in which an incomplete operation hastens the death of a large proportion and leaves the rest to their fate with the aggravation

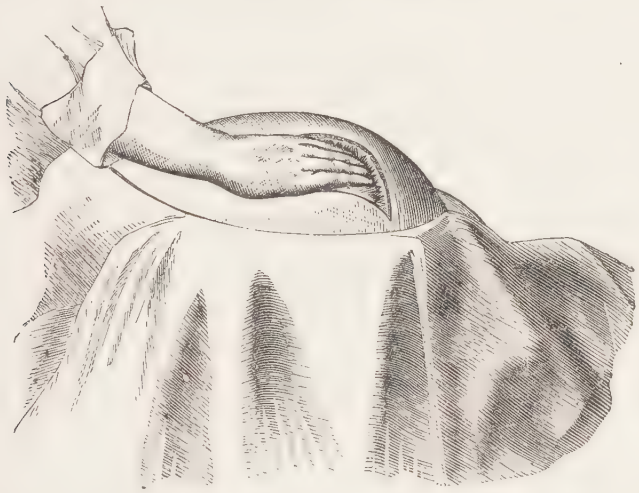
of blighted anticipations; and 4, those in which an exploratory incision only confirms the worst prognostications and leaves the patient scarcely better or worse for the incisions or very much as if she had been tapped only. Experience thus leads us to believe that when in unpromising circumstances anything has to be done, a little freedom and boldness in operation is better practice than, as in the earlier days of ovariotomy, stopping short in sight of what appeared desperate obstacles, with only a moderate opening for investigation and less than space enough for useful manœuvring. More must be said on this subject in the chapter on incomplete operations, especially with reference to extra-ovarian and extra-peritoneal cysts.

The smooth pearly aspect of most ovarian tumours is sufficiently characteristic for immediate recognition, and free movement of the cyst is often visible. But, when a cyst is adherent, it is often extremely difficult to find out the exact limits or boundary between cyst and peritoneum, and, rather than make any improper or dangerous separation, it is better to extend the incision upwards and downwards until some point is reached where the cyst is not adherent. From that point separation of adhesions may be commenced. When there is much fat in the abdominal wall, either in front of or behind the recti muscles, this should be divided by as clean a cut as possible, going through nearly the whole thickness of fat by one stroke of the knife, for, if the fat be much disturbed, troublesome suppuration about the wound is very likely to occur. During the progress of the incision bleeding may be tolerably free, but very often scarcely any blood is lost; and, as soon as the incision has reached the peritoneum, the wound should be carefully cleansed from the blood by soft linen or sponges. Any vessel seen to bleed should be compressed by pressure-forceps. It is important to stop all bleeding from the wound before the peritoneum is opened. It is seldom that any large vessel is divided, but if the compression of the forceps or torsion does not at once stop bleeding, one or more ligatures may be used and both ends may be cut off short close to the knot.

SEPARATION OF THE CYST.

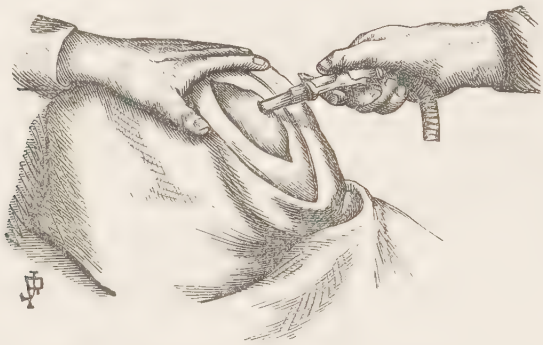
I have just said that if a cyst is so closely adherent that

it is difficult to ascertain its exact boundaries, it is better to empty it before attempting to separate it, than to run any risk either of separating the peritoneum from the abdominal wall, or of so rupturing the cyst that its contents might escape into the peritoneal cavity. And adhesions to the intestine or omentum, especially those at the posterior part of the cyst, are also better left until the cyst is emptied and drawn out, and the separation only completed when the parts to be separated are in full view. When adhesions are loose, or not extensive, and the cyst has been distinctly made out after the division of the peritoneum, the adhesions may



generally be easily separated by one or two fingers, or by inserting the whole hand between the cyst and the abdominal wall—the palmar surface next the tumour, and the fingers curved to adapt the shape of the hand to the convexity of the cyst. Sometimes extensive adhesions yield before a very slight force, but very considerable effort is occasionally required to break them down. Adhesions are very rarely so firm that knife or scissors become necessary to complete their separation; when this is the case, it is better to cut away some small portion of the cyst and leave it adhering to the intestine or some other viscus, than to do any damage by attempting to take away every fragment of the cyst. I have, however, very rarely done

this, as, after the cyst has been separated from the abdominal wall, emptied, and drawn out with the adhering portions of intestine and omentum, I have almost always been able to make complete separation, although great care has often been necessary to avoid injury to the intestine. I have twice opened intestine when separating adhesions, but accurate adaptation of the peritoneal coat by suture has prevented any mischief. In one case I removed about three inches of diseased and adherent intestine, and obtained complete union of the open ends together by two rows of suture through the peritoneal coat only. Occasionally, instead of separating adhering omentum, it is better to divide it at some unattached point, after the application of a ligature or pressure-forceps, allowing the adhering portion to be removed with the cyst. The suppression of



bleeding from separated omentum or parietal adhesions is left until after the emptying of the cyst, securing the pedicle, and cutting away the tumour.

When the tumour is found free from adhesions, or after the separation of slight adhesions, the next step is to empty the cyst. The syphon trocar with spring-hooks has been already described. This instrument, held in the right hand, should be pushed into the most prominent part of the cyst, if this appear to be simple; if multilocular, into that chamber which is likely to contain the largest quantity of fluid, and the point is to be drawn within the canula by means of the thumb-piece.

After a portion of the fluid has been drained off, and the cyst has become more flaccid, it is drawn higher up over the canula by means of hooks or the tenaculum, and fixed between

the prongs of the spring-hooks, which, if properly adjusted, will hold the cyst-wall tightly around the canula. After the first cavity has been emptied, a second, a third, and more if necessary, may be tapped successively without removing the canula from its hold, merely by pushing the trocar forward and thrusting it through the septum which separates the emptied from the adjacent full cavity. In this manner the whole tumour may be emptied of its fluid contents and its bulk so reduced that it may be drawn through the abdominal opening without undue force. In a case where there are several cysts which cannot be tapped one through the other, they must be emptied singly, either by the same trocar or by another. Great care must be taken, if the same trocar be used, lest some remaining fluid should escape through the punctured opening into the abdominal cavity.

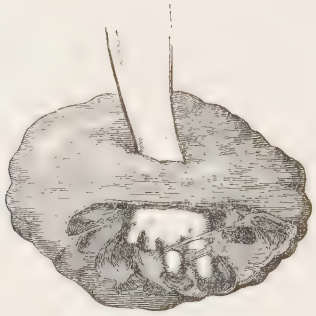
Having succeeded in reducing sufficiently the size of the tumour, the surgeon then draws it through the incision, at the

same time breaking down any adhesions which have not been separated before. The assistant opposite to the operator now places his hands on either side of the incision, and prevents the prolapse of the viscera by carefully keeping the edges of the incision in close approximation. He does this best by placing the middle finger of his right hand inside the abdomen, hooking up the abdominal wall, and then, by the thumb on one side of the opening and the forefinger on the other side, he holds the edges of the opening close together. And he should not allow his attention to be diverted from this very important part of his duty. The assistant at the operator's left hand supports the cyst until it is completely separated, and then receives it in a towel or basin. No traction whatever is permitted, and

the greatest precaution ought to be observed in this respect when the pedicle is short, and when there remain undivided adhesions.

In order to lessen the weight of the tumour, cysts which had not been emptied before may be punctured, and secondary cysts, if the septa are thin, may be broken down by the hand, as shown below. Great care ought to be taken that nothing gravitates into the abdominal cavity.

But it will not be always possible to reduce the bulk of the tumour sufficiently to bring it through the original incision. Tumours are sometimes met with which consist of solid or semi-solid unyielding masses, or they are divided by trabeculæ into small cavities filled with viscid, colloid substance, which cannot



be broken down, and will not pass through the canula. It will therefore become necessary to enlarge the incision upwards. This is less dangerous than any attempt at squeezing a large tumour through a narrow outlet; either the cyst may burst, and its contents escape into the abdominal cavity, or the edges of the wound are so bruised that union by first intention might be prevented, or the peritoneum so injured that fatal peritonitis or gangrene may result.

In a few of my earliest cases I followed the practice of previous operators of having flannels wrung out of water at 96° carefully wrapped round the cyst or any intestine that escaped, and to protect the peritoneal cavity. But I discontinued this practice, finding that it was impossible to prevent small filaments of wool separating from the flannel and adhering to the peritoneum. Then I used soft linen towels, but for many years

past only soft sponges. As the cyst is drawn through the opening, a thin flat sponge, 6 or 8 inches in length and about 4 in breadth, should be passed inwards and left between the intestines and the open abdominal wall. This serves the double purpose of preventing escape of intestines, and protecting the cavity from the entrance of anything from outside, or from cooling when spray is used.

CHAPTER IX.

TREATMENT OF THE PEDICLE; SPONGING OF THE PERITONEUM CLOSURE OF THE WOUND; ACCIDENTS DURING OPERATION.

The cyst or tumour having been drawn out of the abdomen, any omentum or intestine adhering to its peritoneal coat separated, and any bleeding vessel in the part separated secured, the intestines and peritoneal cavity protected as just described by a flat sponge, the next step is to secure the pedicle—the structure and varieties of which have been already described. The operator will do this in different ways, according to his intention to adopt the intra-peritoneal or the extra-peritoneal method.

The older operators, McDowell and Clay especially, adopted a plan which may be considered a combination of both methods. The pedicle was tied with silk or whipcord, the tumour cut away, and the tied pedicle was left low down in the abdominal cavity, surrounded by the ligature, while the ends of the ligature were brought out between the edges of the closed wound. Half or three-quarters of an inch of the lower angle of the wound were left unclosed to admit of the passage of the ligature thread, to keep a space for discharge, and for the removal of the ligatures and of the tissues strangulated by them as soon as separation was complete.

The intra-peritoneal method was originated, in 1821, by Dr. Nathan Smith, of Baltimore, who tied two arteries in the omentum with strips of leather from a kid glove, and also tied two arteries in the pedicle by leather ligatures, and after removal of the tumour, cut off the ends of the ligatures short, and left them within the peritoneal cavity, closing up the wound completely. He was followed by Dr. Rogers, of New York, who, in 1830, also tied separately several large vessels

in the pedicle, cut off the ligatures 'close to the knot, and left them to absorption.' In England this method was revived by Dr. Tyler Smith, was followed by many operators, and after preference for several years of the extra-peritoneal method has come into general favour since the adoption of the antiseptic system.

The other intra-peritoneal methods include the use of the cautery, the écraseur, the twisting off of the tumour, torsion of its vessels, or the separate ligature of the vessels of the pedicle, rather than of the pedicle itself. In cases where there is no pedicle and the cyst has to be enucleated from between the layers of the broad ligament, ligature of bleeding vessels, or of parts of the broad ligament after removal, have almost compelled the adoption of the intra-peritoneal method, since the danger of leaving the ends of the ligature passing outwards has been understood.

In adopting the extra-peritoneal method, instead of shutting up the pedicle with the ligature, or the eschar made by the cautery, within the peritoneal cavity, the pedicle and the clamp or ligature securing it are carefully fixed outside the closed wound.

The following extract from clinical remarks which I made at the 'Samaritan Hospital' in October 1868, and which were published soon after in the 'Medical Times and Gazette,' may be taken as the expression of an opinion which subsequent experience confirmed, until the conclusions were modified by antiseptics, as to the relative value of the extra- and intra-peritoneal methods of dealing with the pedicle.

'Since last October I have completed the operation of ovariotomy in this hospital in thirty-six cases, besides one case in which I performed the operation successfully for the second time on the same patient. Of the thirty-six women, thirty-one recovered and five died. And it is a remarkable fact that in *every case* in which the pedicle was long enough to enable me to use the clamp the patient recovered. There were thirty of these cases—thirty clamp cases in one year without a single death. In two cases I used the cautery. One of the patients recovered, and one died. In four cases I tied the pedicle, and returned it into the cavity of the abdomen after cutting off the ends of the ligature. All these four patients died. Two of

them must have died, I think, in whatever manner the pedicle had been treated. They were almost hopeless cases, and the operation was done as a forlorn hope. In one case the patient was sinking fast from septicæmia, a cyst filled with fetid fluid and poisonous gas having been washed out repeatedly, but ineffectually, with carbolic acid, and it was at last removed with only the very faintest hope of saving life. In the other case, extensive pelvic adhesions and disease of both ovaries had been pretty accurately made out, and had led to repeated tappings rather than ovariotomy. But at length, when tappings became of no avail, the cysts were removed, with some slight hope but with far greater apprehension. A clamp could not be used in either case. The pedicles were too short. The cautery might have been used; but the pedicles were of the kind where the cautery is often ineffectual in stopping bleeding—broad, thin, membranous attachments, with large vessels. In such cases the ligature succeeds well in stopping bleeding; but whether the ends are left hanging out through the opening in the abdominal wall, or are cut off short and returned with the pedicle, the results in my hands have been almost equally unsatisfactory. Other operators have been much more satisfied with the ligature than I have been, and every one must be guided very much by his own experience. But when I look back over the work of the past year in this hospital, where all the patients have been treated in all other circumstances under similar conditions, and find no single death in thirty clamp cases, but every one a recovery, while of six cases treated otherwise five die, you will hardly wonder that I use the clamp whenever I can, especially as very similar results have been obtained in private practice. It is true, as I have just said, that two of these five deaths would probably have happened even if I had been able to use a clamp. But three of the deaths I attribute principally, or entirely, to the fact that, as I was unable to secure the pedicle outside the peritoneal cavity, I was driven against my will to the cautery or the ligature. Twice I used the cautery. In one case it stopped all bleeding, and the patient recovered. In another it only stopped the smaller vessels, the larger having to be tied, and this patient died; so that her death might be added to that of the four who died after the return of the tied pedicle. Or if, as I think it is fair to do, we put aside (so far as the treatment

of the pedicle is concerned) the two cases which probably must have died however the pedicle had been treated, we have three cases where death followed the use of the ligature; and, so far as I can judge from observation of similar cases, these three patients would probably have recovered if the pedicles had been long enough for a clamp to have been applied and fixed outside the peritoneal cavity.' It must be remembered that this was written ten years before I began to adopt what are known as the Listerian details, and the next paragraph was also written without regard to the effects of these details.

The question, what becomes of a ligature, and of the tissues strangulated by it, when closed up in the peritoneal cavity, is a very important one. It is quite certain that the changes differ very widely from those which follow the use of the ligature when the ends are left to pass out through the partially closed wound. In this case they lead to free discharge of serum or pus, until the separation of the ligature and the slough. Whatever may be the material of the ligature, the tissues strangulated by it come away after a longer or shorter process of suppuration; and if anything like what goes on outside the body when one of the extra-peritoneal methods is adopted, or when the wound is left open for the ligatures, went on when the wound is closed, no patient could possibly survive the process. She would almost certainly be poisoned by absorption of the fetid products of the decomposing stump. A very different series of changes must go on when the wound is closed and access of air shut off. Experience shows that many patients do survive the process; and examination of those who have died has shown that a pedicle secured by a silk ligature has been found some days afterwards, either first, surrounded by coils of adhering intestine; second, as the centre of a purulent cavity; third, very little altered, with the ligature deeply imbedded within it; and fourth, completely dead or gangrenous. All these different conditions I have actually seen accompanied by more or less evidence of peritonitis, and depending more, I believe, on the general health of the patient and the conditions in which she was placed, than upon any difference in the material of the ligature or the mode of its application. I must now, of course, add that among the conditions in which the

patient is placed, we attach paramount importance to the presence or absence of infective or putrefying matter.

Our knowledge of this subject has been greatly increased by the report of the experiments of Spiegelberg and Waldeyer, published in 1868, in Virchow's 'Archives.' Their experiments were arranged in two series: 1. Excision of portions of the horns of the uterus of bitches, leaving the ligatures in the peritoneal cavity; and 2. Removal of portions of the uterus by the galvanic cautery. The conclusions of the experimenters are that small foreign bodies may be left in the peritoneal cavity without danger, and that strangulated and cauterized tissues do not become gangrenous and are not injurious to neighbouring parts, provided only that the abdominal cavity is perfectly closed.

We may ask how far the experiments bear out the conclusions; and first as to the changes which foreign bodies themselves undergo when left in the peritoneal cavity.

Ligatures, either of silk or hemp, up to about the twenty-first day, scarcely show any change, except some softening of the hemp. 'Between the particular fibres which compose the ligature thread, a number of young cells insinuate themselves, separating the threads from each other in some places in a remarkable manner, and evidently penetrating from neighbouring parts. After a long time, the fibres are in this manner completely separated from each other, the knots loosened, the threads totally unravelled. Where a ligature had cut through, in several cases its track was marked by the remnants of single fibres.'

Then, as to the changes produced by the ligature in and about the parts where it is applied. The Breslau Professors found the ligatures either '(1) closely encapsuled by newly formed cellular tissue; or (2) free in the peritoneal cavity, having slipped off from the tied parts; or (3) free as if swimming in a small cystic cavity of the stump.' I translate the word *Schnürstücke*, or the end of the pedicle between the spot where it has been divided and the spot where the ligature is applied, as *stump*, because, for want of a better term, we say 'the stump of a pedicle' when we wish to describe that part of it which is surrounded by a ligature or enclosed between the blades of a clamp and is left after cutting away the tumour.

These authors also use two other words—*mesometrium* and *mesovarium*. The former implies what we term the *broad ligament*.

Among the observations on the capsulation of ligatures, we find an account of an interesting case where a ligature had surrounded the body of the uterus, which was cut away nearly an inch beyond; and on the twenty-eighth day the ligature was found sunk into the substance of the uterus, which it had not entirely cut through. The fibres of the ligature were surrounded on all sides by new granulations, and there was not a trace of mortified tissue elements to be found either within or around the ring of the thread. In another case, where ligatures were applied to the uterus before cauterization, microscopic examination fourteen days afterwards showed one of the ligatures closely surrounded by granulating tissue, the cells of which lay in great numbers between the fibres of the silk. Not a particle of mortified tissue could be found anywhere. 'Ligatures on vessels were found after four weeks enclosed in perfectly developed connective tissue. Looking on the mesometrium, small smooth nodules were observed, corresponding in size to the ligatures; but no difference could be found anywhere in the smoothness of the serous membrane covering the knots and that in the neighbourhood. It appeared as if the character of serous membrane upon the outer surface of the connective tissue enclosing the knots had been completely re-established, and the knots had been simply imbedded between the two layers of the mesometrium.'

In one case, where a ligature had completely slipped off from the part which it had surrounded, and had been free in the peritoneal cavity, it had become firmly connected with a neighbouring coil of intestine by means of young cells, springing up from the serous membrane, which had penetrated between the fibres of the thread, so that there was almost an organic union between the surface of the intestine and the knot of the ligature.

Where a ligature had to cut through a thick substance—as the body of the uterus or one of its horns—the track of the ligature could be distinctly seen on section, with help from a strong lens, as a fine gray line. It began as a slight indentation of the peritoneal coat corresponding to the place where

the ligature first caught. As early as the fifth day, this indentation had become so shallow as to be in no proportion to the deeply grooved ring round the tissues powerfully constricted by the ligature. Under a higher magnifying power the delicate line is seen to be formed by a streak of new cells, which mark the track of the ligature; but no trace can be seen of mortified particles of tissue. 'It appears, therefore, that a ligature divides tissues in a very gentle manner, as if the tissue elements became loosened and separated before it, while new cells are formed, and the gap behind it closes, so that the divided surface is scarcely ever exposed, at least within the peritoneal cavity. The first occurrence after the application of a ligature is evidently the union of the two borders of the ring cut by the ligature. In this way the thread is soon shut off from communication with surrounding parts, and then lies completely shut up in a circular canal. We have seen this very clearly in two post-mortem examinations made three days after ovariotomy. There were already abundant groups of new tissue sprouting up from the neighbourhood over the ligatures, which had cut deeply into the pedicle, and almost completely covering it. In the new granulation tissue numerous blood-vessels can be discovered very early, so that the transition to permanent tissue is very soon effected.'

The authors conclude from their experiments that ligatures enclosed in the peritoneal cavity do not lead to any evidence of acute local peritonitis, and, so far as the tissues of the uterus and mesometrium are concerned, can hardly be regarded as foreign bodies. They nowhere induce processes of mortification in these tissues; but, on the contrary, are enclosed and encapsuled on every side by them—in dogs as soon as the eighth day.

We now come to some very interesting observations, well worthy of careful consideration, upon the changes in the surface of the divided parts of the uterus. After a few days—from four to six—no free divided surface could be seen. Surrounding portions of the mesometrium, bladder, or coils of intestine rapidly adhere to it. In one case, after nine days, numerous blood-vessels were observed running between the coats of the bladder and the uterus. In another case, after twenty-one days, the spot from whence an ovary had been

removed could not be detected, so perfectly smooth and free from any cicatrix was the posterior abdominal wall where the ovary had been. In another case, six days after operation, the cut end of the left horn of the uterus was found soldered between two coils of intestine. The mesometrium was drawn in between them and united with their coats and mesentery. The divided horn of the uterus itself was also partly adherent to the intestine.

The most complete and extensive adhesions of the uterus were always with its own mesometrium. This was always observed, even when other organs were also adherent. The cut surface of the uterus falls upon the neighbouring mesometrium; new cells spring up from the latter and unite with the granulations from the uterine surface. Afterwards, retraction of the new-formed granulation tissue draws the stump of the uterus more and more within the folds of the mesometrium, until it is completely surrounded. A very free vascular communication has been observed between their united surfaces. The authors never observed any divided surface either free or with shreds of gangrenous tissue about it.

Similar conditions were observed in the two ovariotomy cases just alluded to. The divided surfaces of both pedicles were on the third day perfectly fresh, without any gangrenous appearance. In the first case, where both ovaries were removed, both pedicles were free and directed upwards; in the second case, the divided surface of the pedicle was in contact with the peritoneal covering of the psoas magnus, with which it was connected by new cells, and without any trace of gangrene.

Passing on to the consideration of the effects produced by the ligature on the part enclosed by it—the stump—the authors say that when a blood-vessel is tied, the strangulated end of the vessel dies and is thrown off with the ligature. Hence the rule not to tie a vessel far from its cut end, but as near as it can be done with certainty to stop bleeding. So that when it was proposed to tie a pedicle of an ovarian tumour and leave ligature and stump in the peritoneal cavity, it was feared that there would be great danger from the death of the strangulated stump. At the same time, if the stump were left very short, by cutting away the tumour close to the ligature, it was feared that the ligature might slip off, and internal bleeding take

place. The authors consider that their experiments prove these fears to be exaggerated—at least they establish the fact that in dogs there is no gangrenous change in the stump, nor any trace of mortification either on the divided surfaces or on the parts behind the ligature. In the case where the divided end of the uterus adhered between two coils of intestine, the stump had contracted to a nodule hardly as large as a pea, consisting of a part of the uterine wall with its mucous membrane everted, and containing all its structural elements, including the utricular glands, completely unaltered. The openings of these glands had thus been brought free in the peritoneal cavity.

Larger stumps were enveloped in folds of the mesometrium. Their canals were almost always pervious, and in some had become dilated into a sort of cyst with muco-purulent contents. Sometimes the ligature-knots lay within these cysts, the textures of the walls remaining almost unaltered, and the mucus- and pus-corpuscles showing very little retrograde metamorphosis. In most cases there remained a narrow communication opening between the cavity in the stump and the rest of the uterus. In two cases the cavity of the stump was obliterated and filled with young granulation tissue, in which no epithelium of the uterine cavity could be found, although there were remnants of utricular glands. All this proves that the textural alterations take place by simple retrograde metamorphosis, fatty degeneration, and gradual absorption, with a formation of cells which become permanently organised tissue, but without the occurrence of any violent inflammatory or gangrenous changes.

The authors have not much to say about the changes in the surfaces cauterized. Only three animals were subjected to experiment, and these were killed on the sixth, fourteenth, and twenty-sixth days after the application of the cautery. On the sixth day the cauterized surface of the central part of the uterus appeared quite fresh, beset with numerous small brown-black particles of animal charcoal, not softened, but firm and hard. At a depth of two or three millimètres, the uterine tissue was coloured reddish, as if from imbibition of the colouring matter of blood. The uterine cavity was shut off from the peritoneal cavity, but rather by the firm aggluti-

nation of the tissues of the cauterized surface than by granulations, none of which could yet be seen. The microscope showed the tissue of the cauterized part to be unaltered, the vessels dilated, and many of them filled with clot. The colouring appeared to be due to blood-corpuscles and diffused colouring matter of the blood. All these changes, however, were circumscribed, and might easily have gone on to complete restoration. Much more extensive alterations were found on the two cauterized surfaces of the uterine horns. These were so completely surrounded by folds of the mesometrium that they could not be seen until these folds had been dissected off. At only one spot of the left horn near the cauterized surface, an opening was found as large as a pin's head, which opened into the dilated cavity of the horn. About two centimètres distant from the cauterized surface, the mucous membrane and the muscular tissue of the uterus were softened and gangrenous. Shreds of mucous membrane lay in the cavity, the walls of which were formed merely by serous membrane and the adherent mesometrium. The vessels, even to the smallest, were completely blocked up by clot. The gangrenous process about the cauterized parts appeared to be due to the extension of clot in the vessels; but all was encapsuled by the mesometrium. No pus was found in the peritoneal cavity, not even near the small opening which communicated with the uterine cavity. A successful result might therefore have been expected. It was obtained in the two following cases.

After fourteen days the cauterized surfaces of the central extremity of the uterus, as well as those of both horns, were all completely encapsuled by mesometrial folds. The central extremity of the uterus was firmly united to the posterior wall of the bladder by perfectly organised connective tissue. The cauterized surface of the right horn was firmly united to a coil of small intestine.

On the twenty-second day repair was found to be complete. The cauterized surface of the body of the uterus was bound to the posterior wall of the bladder by a fibrous band. The cauterised surface of the mesometrium was everywhere smooth; nothing could be seen to show that a piece of it had been separated by the cautery from the horns of the uterus. The cauterised spots on the uterus were smoothly encapsuled, and the only traces

of the cautery were minute remnants of animal charcoal. These fragments of charcoal lay in a firm fibrillated connective tissue which closed the uterine cavity. The epithelium of the uterus and the other elements of the uterine wall were perfectly preserved.

I am indebted to Dr. Maslowsky, of St. Petersburg, for two papers which he kindly sent me, one from the ninth volume of Langenbeck's 'Archiv,' and the other from the 'Berliner Klinische Wochenschrift,' which contain observations corroborative of those by Spiegelberg and Waldeyer. In one successful case Dr. Maslowsky removed both ovaries, treating the right pedicle by the cautery and the left by ligature, returning both into the peritoneal cavity. And he made twelve experiments on rabbits, dogs, and cats, removing the horns of the uterus and the omentum, sometimes by the galvanic cautery and sometimes by redhot irons, in order to study the process of capsulation of the eschar after its enclosure within the peritoneal cavity, and the share which the white blood-corpuscles have in this process. As these corpuscles take up vermilion from the blood, Dr. Maslowsky injected vermilion into the jugular vein at different periods after his experiments, in order to trace the corpuscles in any product of inflammation.

Microscopic examination of the animals at different periods, from fifteen hours to seventy days after operation, proved that the eschar on the uterine horns and on the omentum is first covered by effused fibrine, and is afterward united by membrane with surrounding organs. 'The fibrinous exudation contains many round cells charged with vermilion, and some nucleoli free from vermilion. It soon loses its fine fibrillar structure, and is changed into a finely granular mass. The round cells with vermilion assume an oval form, and then spindle-shaped cells are also seen without vermilion. Some cells contain black nucleoli not composed of vermilion; afterwards these may be seen between the fibres. As the capsulation is completed, the oval cells which contain vermilion become long and then spindle-shaped. And I have sometimes observed that the ends of two spindle-shaped cells coalesce, and at once form a fibre. In the new-formed membrane, capillaries are seen as soon as the fourth or fifth day, and on the tenth or twelfth the vessels may be easily injected.

I have also seen in the membrane newly formed elastic fibres and scaly epithelium, both free from vermilion. The false membranes have a similar structure. It is therefore an undeniable fact, that the white blood-corpuscles participate in the formation of the new membrane which covers the eschar, and unites it with surrounding organs.'

The eschar made by the galvanic cautery consists of animal charcoal and blood pigment. The particles of animal charcoal are partly lying in the eschar, and are partly enclosed in surrounding connective tissue. When red-hot iron is used, the eschar also contains particles of oxide of iron, some of which are also found enclosed by the elements of connective tissue. It is proved that the black specks are really iron by the ordinary chemical reactions. The mucous membrane of the uterus near the cauterized part was suppurating, and the pus-corpuscles contained vermilion.

Dr. Maslowsky also made a number of observations on the mesentery and mesometrium of frogs and rabbits, in order to ascertain the precise changes which the vessels themselves, and the blood circulating in them, undergo after the application of the cautery. From twelve to twenty-four hours before examination vermilion was injected into the jugular vein. The frogs were immobilised by woorara, the rabbits narcotised by opium. The results of the microscopical observations are as follows:—

'*a*. The end of closed arteries is contracted immediately at the cauterized part, but at some distance from it the artery is dilated. The canal of the veins is affected exactly in the reverse manner.

'*b*. The blood in the vessels contains black particles from the heated iron, and separates itself distinctly into a layer of white blood-corpuscles, which are near the cauterized spot, and a layer of red blood corpuscles, which are further away.

'*c*. In the closed arteries after two days the movement of the column of blood is maintained. A part of the blood, with the black particles of the cauterized artery mixed in it, reaches back towards the trunk of the vessel. The movement of the blood in cauterized veins is only kept up for a very short time. There is complete stagnation, not only in the cauterized vein itself, but it extends further up to the junction with larger veins.

'*d*. The black particles are taken up by the white blood-corpuscles. This can be seen most distinctly in the vessels where stagnation of the blood is not complete.

'*e*. The migration of white blood-corpuscles, partly containing vermilion and partly black particles, begins twenty, thirty, or sixty minutes after cauterization. They are first seen in the veins into which the cauterized vein opens; afterwards in the veins near the cauterized part. Very few white corpuscles migrate from the arteries. In frogs, as the mesentery is very broad and transparent, this migration can be observed for three days; in rabbits only for six or eight hours.

'Similar changes in the vessels and migration of white blood-corpuscles I have also observed after ligature of mesenteric vessels, and after burning away part of the tongue in the frog. When entire portions of mesentery are burnt away, the same alterations occur, but to a much greater distance.

'A hot iron, shaped like a bird's bill, so as to enter for some distance into a vessel, was used in three cases, and I observed a migration of white blood-corpuscles, charged with black particles, which chemical reaction proved to consist of oxide of iron.

'It is therefore certain that particles of iron from the iron cautery may be transmitted with the white blood-corpuscles into different tissues.'

The value of these observations is unquestionable; but they did not lead me to look upon either the cautery or the ligature, or any intra-peritoneal method of dealing with the pedicle of an ovarian tumour, as equal, far less as superior, to the clamp, or to any other extra-peritoneal method. And for several years after publishing all this, the more I was driven by the peculiarities of any case, or encouraged by the reported successes of others, or guided by the desire to avoid certain obvious and unavoidable disadvantages of extra-peritoneal methods of dealing with the pedicle, to resort to cautery or ligature—the less was I satisfied with the results of those methods, the more reluctant I was to employ them, and the greater was my confidence in the clamp and the principle of the extra-peritoneal method.

In some respects the experiments are satisfactory, as they tell us what really does take place when a ligature or an eschar is shut up in the peritoneal cavity; and they teach us that we

may resort to the cautery or the ligature, not in nearly complete ignorance as to what we may expect afterwards, but with a pretty accurate idea of the process of repair and of the dangers which may attend this process.

Mr. Doran, in two valuable papers in the thirteenth and fourteenth volumes of the 'St. Bartholomew's Hospital Reports,' gives the results of his own observations of ten cases where he examined the ligature and pedicle at various periods after ovariotomy; all proving that the tied or strangulated stump is not killed, but that 'a communication between the distal and proximal parts of the stump is established by inflammatory plastic effusion, and the ligature is unravelled by granulation-cells insinuating themselves between its fibres.' He also shows that the distal part of the stump may soon form an intimate adhesion with the neighbouring broad ligament. Mr. Thornton ('Med. Times,' June 1880) puts the same conclusion in these words:—

'The ligature buries itself in the peritoneal coat of the pedicle, and vascular connexions are rapidly established between the parts adhering over it. Lymph is thrown out over the end of the stump and over the ligatures; in this new vessels form. The stump adheres to some neighbouring surface, and from that derives its main blood-supply. In either case the passage of blood through the capillaries under the ligature is an important aid. By whichever method the nourishment of the stump is carried on, the strands of the ligature are separated by ingrowth of new cells, and it is soon absorbed and disappears. Sometimes the knot (or the whole ligature, if very thick silk is used) becomes encapsuled, but complete disappearance is the rule. It will be obvious that the least favourable method is that in which the cut surface of the stump adheres to some neighbouring part; because if it be to intestine it may cause a kink and direct obstruction, and if it be to some other part it may form a bridge, under which a coil of intestine may become adherent or strangulated, and thence may follow indirect obstruction.'

And it must not be forgotten that even in healthy dogs and rabbits where the ligature or the cautery was considered by the German experimenters to have been most successful, we have seen that adhesion of the tied or cauterized part to the bladder, to intestine, and to neighbouring folds of peritoneum,

has been the rule, just as in cases which I have placed upon record where adhesion of the tied or cauterized pedicle to intestines has led to fatal strangulation. Even if not fatal, such adhesions are more likely to lead to obstruction of intestine more or less serious and prolonged, and to be permanently injurious, than the mere adhesion of a pedicle to the abdominal wall.

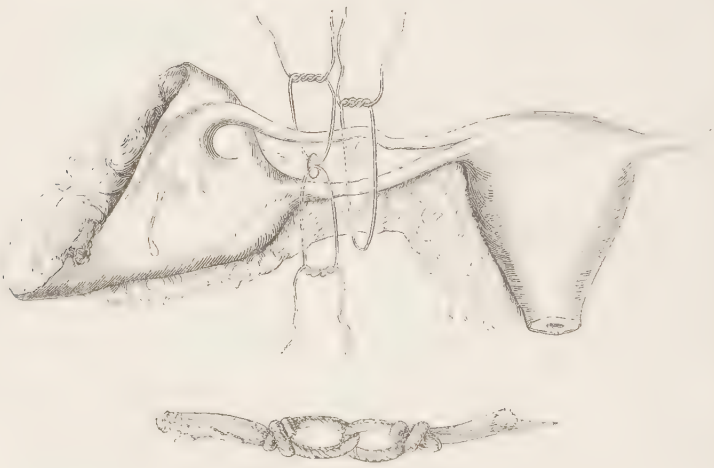
Those who exclusively follow the intra-peritoneal method, and either use the cautery or return the ligature and close the wound, appear to have been influenced by objections to the extra-peritoneal method which seem to me to be either groundless or trivial. When the pedicle is held outside the wound by a clamp or in any other way, the pull upon the uterus or broad ligament is said to be very painful; but I have seen a good deal of pull with very little pain, and much more severe pain in cases where the ligature was used than I ever saw in clamp cases. So with sickness: I have seen as much or more after the ligature or cautery, as I ever saw after the clamp. It is said to set up fetid discharge and poison the wound or the patient; and so it does if proper care be not taken. But if the strangulated part of the pedicle which projects beyond the clamp be well saturated with perchloride of iron, the slough is tanned; it becomes as hard and dry as a piece of leather, and there is an end to that objection. It is said to cause suppuration about the wound; but this, again, I have seen both after the ligature and cautery. I never saw more profuse suppuration of the stitches than in one case where I divided the pedicle with the écraseur, and closed the wound with platinum wire sutures. Then, after the wound is closed, it is said to lead to a reopening each month, and an escape of some menstrual fluid. And this is true in some—perhaps in nearly a third—of the cases. But if the patient be prepared for it, it is not of the slightest consequence. The Fallopian tube almost always contracts completely after a few months, and there is no further escape. I can only recollect two cases where it has continued up to the date of the last report from the patient, and then it caused but slight inconvenience. If menstrual fluid can escape through the partially closed Fallopian tube fixed in the cicatrized wound, so it may escape if the tube be left within the peritoneal cavity, and the result may be a

fatal hæmatocele. I have known this to occur in two cases where the ligature was used and cut off short; and I believe it to be one of the strongest objections to this method, or to any intra-peritoneal method of dealing with the pedicle. I can recall at least six patients who, at various periods after recovery from intra-peritoneal treatment of the pedicle, have suffered from conditions which I could only explain on the supposition that the end of the Fallopian tube remained open, and that a hæmatocele of more or less serious importance had formed at successive menstrual periods. Fortunately, I have never had an opportunity of testing the accuracy of this diagnosis by post-mortem examination. As to any fancied impediment to the increase of the uterus in pregnancy, and to its contraction during labour, from the adhesion of the tube to the cicatrix, cases will be found, when we come to consider the subsequent history of patients who have had children after ovariotomy, amply proving that, neither during pregnancy nor labour, has any suffering or difficulty been attributed by them to any such consequences of the use of the clamp. Many women have had one child, some two, some three, and others as many as six or seven children; and in no case has any unusual suffering been referred to the adhesion of the pedicle to the abdominal wall. One *real* objection to the clamp is that it may possibly pull on intestine, or a tense pedicle may strangulate intestine (and I have seen one such case). But this objection is of little weight if the use of the clamp be restricted to cases where the pedicle is so long that there is not much drag on the clamp. Where, however, we have a broad, thick, short pedicle, or a broad connection between uterus and cyst rather than a distinct pedicle, we must have something different from the clamp. And we have the choice between one or other of the intra-peritoneal methods.

But no surgeon who has had much experience of ovariotomy would bind himself to adopt in all cases either the extra-peritoneal or the intra-peritoneal method, or any of the modifications by which either principle is carried out in practice. Every surgeon should go to an operation prepared to carry out the particular method which appears to be best adapted to the peculiar circumstances of the case which present themselves as he proceeds. But since the great success which has attended

the combinations of antiseptic ovariotomy and the complete intra-peritoneal treatment of the pedicle, the extra-peritoneal method may be considered as almost abandoned, and we have to choose between the ligature and the cautery.

In ligaturing the pedicle of an ovarian tumour, it is never safe to trust to a ligature which does not transfix the pedicle, unless this be very long and slender. Many cases are on record where, after cutting away the tumour, a simple encircling ligature has slipped off, and dangerous or fatal bleeding has followed. It should be a rule, therefore, always to transfix a pedicle, and, according to its size, to tie in two or more portions,



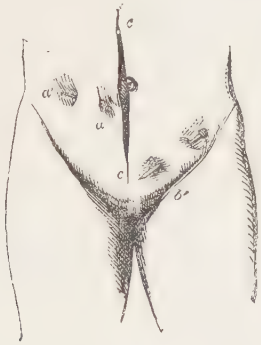
before the cyst is cut away. A long ordinary needle double-threaded may be used, or a long blunt-pointed needle on a handle, straight or curved. The latter is safer and more convenient if the pedicle cannot easily be brought well outside the abdomen. Both threads having been carried through the same puncture, one is tied above and one below the Fallopian tube, as shown in the sketch, a second turn having been given to the first loop to prevent slipping when the second turn securing the knot is made. For additional security a separate ligature may be tied between the two first passed and the uterus. Mr. Bryant and some other operators think it important that one loop should be laced within the other, as shown in the lower sketch. But

I rather avoid this, as it is possible that by so tying the second knot the first may be loosened. Supposing a clamp or pressure-forceps to have been first applied, the cyst cut away, and the pedicle then transfixed and tied between the forceps and the uterus, the clamp must be loosened or the forceps removed before the ligatures are tightened. If this is not done, the knot cannot be tied so tight as to be secure after the clamp is removed. As the clamp is taken off, the tissues compressed by it retract, and are apt to slip from under the ligature. This can only be avoided by tightening the ligatures simultaneously with the loosening of the clamp or removal of the forceps. Mr. Doran's observations lead him to the conclusion that 'it is much more dangerous to draw the ligatures a little too firmly, than to leave them somewhat looser than is strictly advisable;' and Mr. Thornton considers the presence of blood-clot on the cut surface of the stump 'as the perfect condition to aim at in the treatment of the ovarian pedicle by ligature. This cap of blood-clot shows that the ligatures, while tight enough to prevent serious hæmorrhage, were not so tight as to cut off all supply from the distal portion of the stump.' I differ entirely both from Mr. Doran and Mr. Thornton, and fearing that a loose ligature will become looser as the included tissue shrinks, that bleeding would be probable, and that unless a ligature sinks deeply into, or forms a deep groove in the pedicle, the surfaces of peritoneum on either side of it are less likely to unite, cover up the silk, and maintain the vitality of the stump, I always tie the ligatures as tightly as I can.

If it be desired only to tie the vessels, it may be done by feeling the arteries, and carrying a ligature round them through the pedicle before the cyst is cut away; or, after the application of forceps and removal of the cyst, holding the pedicle carefully as the forceps are removed, and tying any vessel which bleeds. The great objection to this plan is, that there is often much loose cellular tissue, rich in small veins, which go on oozing after all the larger vessels have been tied. Whichever may be the plan preferred, the important question arises: Shall the ends of the ligatures be cut off, and the wound closed? or shall they be left hanging out through a part of the wound, purposely left open for their passage, and that of the slough they embrace when it separates? Dr. Clay, of Manchester,

advocated this latter practice. In its favour, it may be said, that it is a method applicable in all cases; that it secures an outlet for serum from the peritoneal cavity; and that, after the separation of the ligature and slough, no foreign body is left within the patient. But it seems to me that the ligature-threads act as a sort of seton in the peritoneal cavity, excite the formation of the serum for which they are said to provide the outlet, and counteract antiseptic precautions. Having tried both methods, the results would lead me to cut off the ends whenever the patient is in pretty good condition, and sthenic peritonitis with effusion of lymph may be expected; and if low diffuse peritonitis and effusion of serum may be feared, then it would be better to secure a drain through the wound for the serum by a glass drainage tube than by the ends of a ligature. I have treated cases successfully in this manner, but the results have not been so satisfactory as to induce me to use it, unless compelled to do so by the circumstances of the case. On this question of drainage I shall have more to say hereafter. One objection is, that even if the patient recover, there is a great liability to ventral hernia. The cicatrix remains weak at the spot where the tube or ligatures passed out, and it yields before the pressure outwards of the viscera. I have seen this in nearly every case where I adopted this plan; in several where it followed the clamp; in some, but in smaller proportion, where the complete intra-peritoneal method was practised, and I have come to the conclusion that if we use one or more ligatures, it is better to cut off the ends short, and close up the wound completely. Wire has been used for this purpose; but it seems an irrational practice. Silk, if pure, is an animal substance; and experiment proves that it may be absorbed. Wire cannot be absorbed, and must be more or less of a mechanical irritant. I tried wire on one side and silk on the other side of a sheep on which Professor Gamgee operated for me at the Albert Veterinary College, and the superiority of the silk was manifest. What we have to look to is the effect on the tissues strangulated, rather than the material by which the strangulation is effected. Catgut has been used, but I know of nothing to show that it is superior to carbolized silk. Professor Billroth thinks it necessary to boil the silk in a 5 per cent. solution of carbolic acid. I have been content with simply soaking the silk in the solution.

Acupressure was once applied successfully by Sir James Simpson. He secured the pedicle by passing a long needle through the abdominal wall, across the pedicle, and out again. The pedicle was thus compressed by the needle, as here shown, on the outside of the abdominal wall. The head and point of



the needle are seen on the surface of the abdomen, compressing the pedicle in the left iliac region. Another pin, to the right of the incision, is supposed to compress vessels opened during the separation of adhesions. The next cut is a diagram of an

impossible view of the inner surface of the abdominal wall, with one acupressure needle crossing a wounded vessel near the incision, while a larger needle, at *b*, passes across the pedicle of the ovarian tumour which has been removed. The uterus is shown at *d*, and the rectum at *e*.

Sir William Fergusson once tried this plan, but was obliged to resort to the ligature. I have never tried it myself, though I

have more than once found acupressure useful in stopping bleeding from vessels torn in separating adhesions.

The écraseur has been used for the compression and crushing of the pedicle and the final separation of the tumour; after which the pedicle is dropped into the abdominal cavity and the wound closed. Grave objections, however, against this practice are the possibility of internal hæmorrhage and its accompanying dangers, and the difficulty of finding and securing the bleeding pedicle in the depth of the abdominal cavity after having reopened the wound. This would be especially difficult if hæmorrhage occurred after some lapse of time. I once used the écraseur and successfully; but I have not ventured on it again, for fear that it might prove untrustworthy and dangerous internal bleeding occur. This danger might be prevented by tying a strong ligature below the écraseur chain, before separating the cyst and dropping the pedicle into the abdominal cavity. But then it would be only a modification of the former methods of ligatures, and open to the same objections.

The *cautery* alone would almost certainly fail to stop such large vessels as are frequently met with in a pedicle. So might the écraseur alone, or the crushing which precedes the division by the écraseur. But *the combination of crushing and the cautery* is certainly efficacious in a considerable proportion of cases. Mr. Clay, of Birmingham, introduced the practice and carried it out by his adhesion clamp and hot irons, both for dividing adhesions and omentum. The practice was extended to the pedicle by Mr. Baker Brown, and has since been used chiefly by Dr. Keith. It is claimed for it that in most cases it effectually stops hæmorrhage during the operation and prevents it afterwards, that it leaves only a very thin layer of burnt tissue at the end, and is followed only by the changes which have been described in a former page. This method is of most value in cases when the pedicle is broad, thick, and short; it does not answer well when large vessels ramify in a thin membranous pedicle. Notwithstanding the great advantage which deservedly recommends the cautery, its use is sometimes attended by serious drawbacks. Vessels not unfrequently bleed on opening the blades of the clamp, and a repetition of the whole tedious proceeding, or the use of ligatures, is neces-

sary before the pedicle can be returned into the abdomen with safety.

The instrument used for securing and compressing the pedicle is Mr. Clay's (of Birmingham) adhesion clamp, modified first by Mr. B. Brown, afterwards by me and by others. Having adjusted the clamp and tightly compressed the pedicle between its blades, which are kept closed by means of a screw, the tumour is cut off a short distance above the clamp. The projecting portion of the pedicle is dried, and held with a forceps during the application of the cautery. In order to protect the surrounding parts from the hot iron, towels or flannel, placed between the clamp and the abdomen, were first employed; but they often proved insufficient. I have used two shields made of talc (neutral silicate of alumina, a perfect non-conductor of heat), which, when placed around the pedicle, will protect the skin and any part likely to be injured. The cautery-irons, which are wedge-shaped with a blunt edge, should be heated to a dull red heat, and pressed slowly and firmly across the protruding portion of the pedicle, until this is burnt off clean down to the surface of the clamp, as shown in the drawing on page 280, before the tumour has been cut away. This done, the blades are cautiously opened, the operator and his assistants being prepared to seize the pedicle, and prevent it from slipping into the abdominal cavity, in case any bleeding should occur. Having convinced himself that there is no bleeding, the operator gently disengages the pedicle from the blade, and allows it to drop into the abdominal cavity.

Dr. Maslowsky uses a long pair of forceps which compress the pedicle at only a few points, yet hold it securely—and these are applied before the clamp is removed. Then if any vessel bleeds, it can be touched by a pointed cautery. The late Dr. Wright devised an ingenious clamp, by which, before opening the blades, a succession of steel bars can be lifted by means of screws, and the pedicle thus partially exposed, in order to discover and to secure any bleeding vessel without disengaging the whole pedicle from the grasp of the clamp after the application of the cautery. Mr. Clover introduced a very useful cautery of pure silver, heated by burning spirit. Mr. Bruce invented a gas cautery. The electric cautery and Paquelin's cautery have also been used.

Although the clamp is now almost disused, it is so simple, safe, and rapid a mode of dealing with the pedicle for an inexperienced operator that it is almost necessary to repeat the directions for its use given as follows in my edition of 1872.

The next drawing, by Dr. Junker, was made when he was watching me actually applying the form of clamp which I last

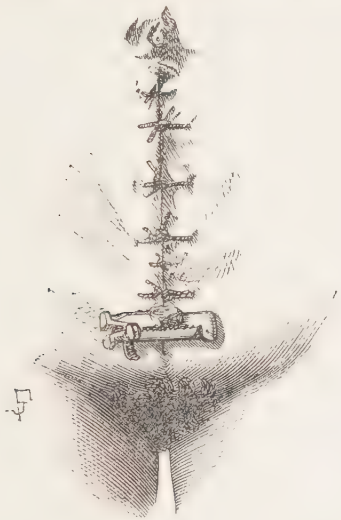
used. The tumour was held up by one of the assistants, the clamp passed round the pedicle, and my right hand is shown

pressing the blades of the clamp together by the forceps. This compression should be very firm, and the forceps should be held, while the screw which fixes the clamp is tightened

by the left hand. After the tumour has been cut away, it is sometimes necessary to tighten the clamp still further, or to tighten the screw. The assistant keeps the abdominal wall closed around the pedicle, as shown in the second drawing on the previous page, also from the life; while the surgeon, holding the clamp-forceps with his left hand, fastens the screw with his right, assisted by the needle holder.

It would seem unnecessary to add that the surgeon should be extremely careful not to enclose anything but the pedicle in the clamp, but the fact that cases are on record where a portion of the bladder has been squeezed, and where one ureter has been strangulated, and that I have myself seen a strip of omentum several times, and a coil of intestine once, very narrowly escape constriction, shows that the caution is not uncalled for.

After the tumour has been cut away and the screw securely tightened, the edges of the wound are held in contact round the pedicle, which, with the clamp, should be brought as near to the lower end of the incision as can be done without traction,



and the edges of the wound are brought in contact around it, as shown in the above drawing.

Any superfluous portion of the pedicle protruding beyond

the clamp is cut off, but not quite close to the clamp, for this would lead to the danger of the pedicle as it shrank sinking or being drawn inwards. It is as well to leave about a quarter of an inch protruding beyond the clamp, and this should be touched with solid perchloride of iron, by which the tissue is tanned until it becomes quite dry and leathery, and is preserved from putrid decomposition. The following tables show the results of my own trials of various modes of dealing with the pedicle in 1,000 cases.

VARIOUS MODES OF DEALING WITH THE PEDICLE AND ATTACHMENTS OF THE TUMOUR.

First Series of 500.

	Cases	Recoveries	Deaths	Mortality per cent.
Clamp	349	280	69	19·77
Pin and ligature acting as clamp	15	10	5	33·33
Clamp and ligature	34	23	11	32·35
Ligature returned	57	29	28	49·12
Ligature brought out	14	6	8	57·14
Cautery	16	14	2	12·5
Cautery and ligature	14	10	4	28·57
Écraseur	1	1	0	0
	500	373	127	25·4

VARIOUS MODES OF DEALING WITH THE PEDICLE AND ATTACHMENTS OF THE TUMOUR.

Cases 501 *to* 1,000.

	Cases	Recoveries	Deaths	Mortality per cent.
Clamp	274	217	57	20·8
Pin and ligature acting as clamp	2	1	1	50
Clamp and ligature	15	11	4	26·66
Ligature returned	203	162	41	20·19
Ligature brought out	—	—	—	—
Cautery	—	—	—	—
Cautery and ligature	—	—	—	—
Écraseur and pin	1	1	0	0
Forceps and ligature	1	0	1	100
No ligature—enucleation	3	3	0	0
Cyst wall sewed to abdominal wall	1	0	1	100
	500	395	105	21

VARIOUS MODES OF DEALING WITH THE PEDICLE AND ATTACHMENTS OF THE TUMOUR.

The whole Series of 1,000.

	Cases	Recoveries	Deaths	Mortality per cent.
Clamp	623	497	126	20·22
Pin and ligature acting as clamp	17	11	6	35·23
Clamp and ligature	49	34	15	30·61
Ligature returned	260	191	69	26·53
Ligature brought out	14	6	8	57·14
Cautery	16	14	2	12·5
Cautery and ligature	14	10	4	28·57
Écraseur and pin	2	2	0	0
Forceps and ligature	1	0	1	100
No ligature—enucleation	3	3	0	0
Cyst wall sewed to abdominal wall	1	0	1	100
	1,000	768	232	23·2

Whether the clamp, the cautery, or the ligature be used, when dividing the pedicle and separating the cyst, the utmost care must be taken to prevent any of the contents of the cyst entering the abdominal cavity. Should this have happened notwithstanding all the precautions taken to avoid it, the cavity must be carefully sponged and cleaned of all extraneous substance with soft sponges wrung out of warm water.

The omentum, the mesentery, and the situations of the adhesions to the anterior abdominal wall will often be found the seat of hæmorrhage, either from the orifices of large vessels or from capillary oozing. The bleeding must be stopped by tying the vessels with ligatures, the ends of which are to be cut off close to the knot, or by torsion, or by the pressure of a needle passed across.

As soon as the pedicle has been secured and the tumour removed, and any omental or other vessels injured during the separation of adhesions, and bleeding, have been tied, the other ovary should be examined. It is easily found by grasping the fundus of the uterus, and passing the hand downwards along the tube and side of the uterus. If the ovary is healthy, it is found to be of about the normal size and consistence. Its surface may be irregular from recently matured Graafian follicles, but these need not lead to interference unless the ovary

is two or three times its normal size. If one or two Graafian follicles are very large, they may be punctured, and the clot they contain squeezed out. If the ovary is hardened or so enlarged that disease appears likely to go on, it should be removed. Occasionally the pedicle has been long enough, especially in cysts of considerable size, to admit of the application of a second clamp; and I have fixed two clamps outside the abdominal wall with little more inconvenience to the patient than one. In other cases I have transfixed the pedicle of the second tumour, tied it in two or more portions, brought it outside, and tied it to the clamp securing the first pedicle. In other cases, where there was no pedicle, but a close attachment of the ovarian tumour to the side of the uterus, after transfixing the attachment, tying it, and cutting away the tumour, I have cut off the ends of the ligatures short and left them. In one case, where two ovarian cysts had burst, the contents had escaped into the peritoneal cavity, and general chronic peritonitis had followed, both pedicles were secured in separate clamps, one to each pedicle, and they were easily kept above the united wound. The patient made a good recovery. Recently I have always tied both pedicles with silk, cutting off the ends short, just as when only one ovary has been removed.

Besides examining the second ovary, the state of the uterus should be ascertained. It may be enlarged by pregnancy, as described in Chapter XIII., or it may be enlarged by fibroid growths or out-growths. In one case, after completing ovariotomy, I also removed a fibroid out-growth from the fundus uteri. This patient died, and I think she would have recovered if I had left the uterus alone, as I have done in five or six cases since, where the size of the growths was insignificant. But when they have been large enough to cause much inconvenience, I have removed them at the same time as the ovarian tumour. Two years ago, Case 979, the patient recovered after removal of a uterine tumour nearly as large as the ovarian, and this year I successfully removed a dermoid cyst of the left ovary, and a fibroid outgrowth from the right side of the uterus at the one operation. More will be said on the removal of uterine tumours in the concluding chapter of this book.

Before proceeding to close the wound, the peritoneal cavity must be thoroughly cleansed from any fluid or clot which it

may contain. A good deal of fluid may be simply pressed out, or scooped out as it were, by the hand of the operator; but complete cleansing can only be effectually attained by using many clean, soft sponges in succession, passing them well down behind and in front of the uterus, along each flank in front of the kidneys, and over the abdominal wall wherever adhesions have been separated, carefully removing any clot which may be seen or felt among the coils of intestine or folds of omentum. When I began to insist upon the importance of this process, which Dr. Worms described as *la toilette du péritoine*, other operators said that it was unnecessary or injurious; that ovarian fluid in the peritoneum was harmless; or that the time lost in removing it, and the irritation caused by the sponging, were greater evils than a little fluid or blood left in the cavity. Impressed by these objections, I was in one case less careful than usual in sponging away ovarian fluid. A fatal result followed, and I at once published the case, rather as a warning than an example, and I have ever since been extremely careful to remove all I possibly could by thorough sponging, and have been well satisfied with the general results. I have regretted incomplete sponging, never that I had been too careful. And it is very convenient to insert a large, broad, flat piece of thin sponge just within the wound, and leave it all the time that the sutures are being passed. It protects the intestines and peritoneal cavity generally, catches any drops of blood which may follow the passage of the needles, and if spray be used protects the cavity from the cooling effect of the spray, or the entrance of carbolic acid.

The next step will be to close the wound. In my early cases I did this by passing ordinary or gilded hare-lip pins through the whole thickness of the abdominal wall at intervals of an inch. Each pin perforated the skin about an inch, and the peritoneum about half an inch, from the incision on either side; so that when the two opposed surfaces were pressed together upon the pin, two layers of the peritoneum were in contact with each other. But I soon began to use and prefer sutures to pins, and tried different materials for this purpose—hemp, twine, silk, silver and steel wire, telegraph wire coated with gutta-percha, and strong horse-hair. After repeated comparative trials I found thin strong Chinese silk superior to the other

materials. For the last three years I have soaked the silk in a 5 per cent. solution of carbolic acid before using it. Perhaps it may be found safer to boil it in the carbolized solution.

The most convenient manner of applying the sutures is the following. Silk about eighteen inches in length is threaded at each end on a strong straight needle. Each needle is introduced from within outwards, through the peritoneum and the whole thickness of the abdominal wall, at about one-third of an inch from the cut edges of peritoneum and skin on either side—pinching up peritoneum and skin together, so that the silk may be carried through both without perforation of the recti muscles. The ends of the sutures are held by the assistant, who draws up the lips of the wound until all the deep sutures have been applied. Then the lips of the wound are held apart again, in order that the operator may convince himself that no further bleeding has taken place within the abdominal cavity, which, if required, has to be sponged again, and the protecting sponge removed. This done, the sutures are tied, and the ends of the threads cut off. If the abdominal wall is very thick, superficial sutures may be required between the deep ones. If the pedicle has been secured by the clamp, a suture should be passed close to the latter, in order to bring the lips of the wound so accurately around the pedicle that the peritoneal cavity is perfectly closed. At the risk of being tedious, I repeat that the including of the peritoneum within the stitches is of the utmost importance for the success of the operation. The two peritoneal layers adhere together very rapidly. At the post-mortem examination of patients who died after twenty-four hours, the edges of the peritoneal incision have been found firmly united by first intention. Thus pus and other secretions from the wound are prevented from entering the peritoneal cavity, adhesion of the omentum or intestine to any part of the inner aspect of the wound not covered by peritoneum is avoided, and such firm union is secured that a ventral hernia seldom occurs after recovery.

After the closure of the wound, that part of the abdomen which has been exposed is carefully dried and cleaned, the india-rubber cloth removed, and the wound covered with some non-irritating antiseptic gauze, or boracic wool, and supported by long strips of adhesive plaster. In many cases the false ribs

have been pressed outwards by the tumour, and after its removal a deep hollow is left. This must be filled up with pads of cotton-wool. A flannel belt is adjusted around her abdomen, and the patient is then gently removed to her bed. She is kept on her back, her knees supported by a pillow, is covered with light but warm blankets, and provided with hot-water bottles, if she is at all chilly. The room is darkened, and she is left alone with her nurse. Dr. W. Webb informs me that after ovariotomy and other serious operations, patients rally much more rapidly if the head be kept warm, covered up with a shawl or flannel. And when we reflect how temperature is lowered by cooling the head, it is not difficult to understand that warming the head until reaction after shock is well established may be very advantageous. If reaction is slow the head should not be raised by pillows, but kept low.

ACCIDENTS DURING OPERATION.

Fainting is an accident which may happen in any operation, and before the use of anæsthetics was not uncommon. I have, however, never been embarrassed in my ovariotomies by this condition of the patient. And only in one case has the methylene caused any trouble. Then the pulse became for a little while imperceptible, and we were obliged to give a small quantity of brandy. After swallowing it the woman rallied. She had some thoracic complication, and though the cyst only contained about sixteen pints of fluid, yet, as the removal was very quickly over, it is possible that the enfeebled heart and lungs were unable to accommodate themselves to the sudden change of pressure.

Out of the 127 deaths which followed my first 500 operations, 20 were put down as the effect of exhaustion, and none from hæmorrhage, while in the second series of 105 deaths there were only eight from exhaustion and two from hæmorrhage. The probability is that some of the first series of deaths were also partly due to bleeding, but the fact was not established by examination. The deaths from exhaustion were mostly at the end of two or three days, but in one as early as thirteen hours. No case of collapse after the operation happened in the second series, but in the first there were six cases

—the time being from two hours to about forty hours. No death has ever occurred during the operations either from shock or the anæsthetic.

Thus out of the 232 deaths after operation only 36 are immediately attributable to it, under the heads of shock and hæmorrhage, a proportion to be lessened by increased experience. The remaining mortality of 196 was due to other and accidental causes; and considering the large proportion of septic disease which proved fatal during the earlier years, was to a great extent avoidable, and the result of inexperience. The mortality of 3·6 per cent. from shock and hæmorrhage corresponds very nearly with the results of Keith's practice, in which there are very few deaths recorded as from secondary causes; while in my own experience in private cases and since adopting Listerian details, amounting to 173, I have had only three immediate deaths, two from cardiac embolism in about twenty hours, and one from hæmorrhage almost immediately after the patient was in bed. But this was not a case of ovariotomy only. It occurred since the completion of the 1,000 cases, and I unwisely, after removing an ovarian tumour, attempted to remove a cyst of the liver. In one case of secondary bleeding which came on shortly after the operation was finished, the patient had put herself into a violent passion in consequence of a silly remark made by one of the attendants. An intelligent nurse saw at once what had taken place, and was fortunate enough to find me not far off. On arriving I reopened the wound, put another ligature on the pedicle in lieu of the one which had slipped, cleared away the clots, and left her a little weaker but not the worse for the accident. She got rapidly well, but died this year of cancer. In another case I feared from the symptoms that the ligature had slipped, and that the patient was dying of internal bleeding, but the father and brother of the lady, both medical men, were opposed to the reopening of the wound, and would not permit an examination after death, so that I am not quite sure how far my fear was well founded.

Burst cysts and suppurating cysts do not seem to have lowered the success of my operations. There have been 15 such cases, 12 burst cysts, and 3 suppurating cysts, among my thousand operations, and only one death resulted.

Injuries to viscera.—Several cases are on record, and I have heard of others not recorded, where the bladder has been injured either in making the first incision or in separating adhesions between the cyst and the bladder. Should the bladder be injured, the opening should be very carefully closed by suture, and a catheter maintained in the bladder for several days. As a rule the effects have not been serious, although in some cases the urine has drained through the wound for several days. In one case where I had cut into a patent urachus from which urine escaped, I closed the opening by one of the sutures which closed the incision in the abdominal wall, and no inconvenience followed. The rectum has been torn or divided during the separation of adhesions, in some cases with fatal consequences; in others, where accurate closing has been effected by suture, recovery has followed without any fœcal fistula. In a patient on whom I operated in August 1876, removing both ovaries, which were closely united to each other behind the uterus, on separating attachments between the uterus and the rectum, I tore out a piece of the rectum as large as a sixpence, and fœcal matter escaped. I inverted the edges of the opening so as to bring two surfaces of the peritoneum in apposition, united them by a continuous silk suture, and the patient recovered without any ill-effect from the accident. In another case operated on in the Samaritan Hospital in June 1875, in removing an enormous malignant growth weighing 41 lbs., I also detached about two inches of small intestine, the coats of which were involved in the disease. The upper and lower ends of the gut were carefully brought together and united by peritoneal suture, but the patient died on the eleventh day. Although some fœcal fluid had escaped from the wound in the abdominal wall, the bowels had acted freely in a natural manner, and it appeared that the wound in the intestine had but little to do with the fatal result. The practical lesson from this is to be extremely careful when separating adhesions between the cyst and intestine, and if the intestine is either accidentally wounded, or a diseased portion is intentionally removed, the union of the peritoneal edges by fine sutures must be very carefully and accurately completed. In December 1881 Professor Billroth in making a double ovariotomy was obliged to resect part of the bladder and some inches of small intestine

on account of very strong adhesions between these parts. I have not heard how the case ended.

The liver has been injured during the separation of adhesions. In one case, in an insane patient, under the care of Mr. Archer, of St. John's Wood, I removed some ounces of the lower edge and under surface of both lobes of a large liver. I had considerable trouble in stopping the bleeding, and applied perchloride of iron freely. The ovarian cyst for which I was operating was a very large one, and the patient in an extremely feeble condition after repeated tappings, yet she recovered as rapidly and completely as in the most simple case, is still alive, and has regained her soundness of mind as well as body. In one other case, already alluded to, I lost a patient from hæmorrhage after opening a cyst which projected from the under surface of the liver, the walls of which poured out blood with extreme rapidity in spite of all efforts to check it.

I have never met with a case in which the spleen has been injured during ovariotomy; but an enlarged spleen has been occasionally mistaken for an ovarian tumour, and splenic cysts mistaken for ovarian cysts have been removed more than once successfully, though generally with a fatal result. Should either of these mistakes be recognized after beginning an operation, the surgeon must act exactly as if he were doing splenotomy.

The kidney.—Enough has been said about renal cysts and tumours to render it unnecessary to say more than that if a kidney should be unavoidably or accidentally removed with, or instead of, an ovarian tumour, as much care would be called for in securing the blood-vessels as in a case of nephrotomy planned beforehand. One or both ureters are known to have been divided or tied accidentally. In Simon's famous case, where a urinary fistula remained after injury to the right ureter, Simon removed the right kidney, and I saw the woman some months afterwards in excellent health. In a similar case Nussbaum, instead of removing the kidney, re-established communication between the kidney and the bladder by a series of patient manœuvres, of which he has published an interesting account. It is remarkable that in cases of adhesions low down in the pelvis the ureters should escape injury so often as they do. I suspect that their condition has been overlooked in some post-mortem examinations, and it is extremely probable

that in some of the cases where suppression of urine has been a prominent symptom, one or both ureters may have been injured.

After passing the sutures which are to close the abdominal wall, and before tying them, the sponges and forceps should be counted. It is a good plan to take the same number of sponges and forceps to every operation. By forceps I mean the torsion or pressure-forceps, the use of which has been already described. Of these I always take twelve, of sponges twenty. If any other than the usual fixed number be taken, some doubt is almost certain to arise when the nurse is told to count the sponges. Very small sponges are so easily lost, that it is advisable not to use any which when wet are smaller than an ordinary closed fist. Even then it may not be easy to find one when wet in the peritoneal cavity. It is a good rule for the surgeon strictly to forbid either of his assistants to put a sponge within the abdominal cavity. No one should be allowed to divide a sponge. One of my friends abroad writes that in one of his fatal cases a sponge was found in the peritoneal cavity. He had suspected that a sponge might be within the abdomen at the end of the operation, but could not find it, and on counting the sponges the number was complete. It afterwards appeared that one had been torn into two by one of the nurses. No one who has not tried it can understand how difficult it may be sometimes to find a lost sponge.

In my lectures as Hunterian Professor at the Royal College of Surgeons in June 1878, I gave the following account of the only case in which I left a pair of forceps in the abdomen. 'Not very long ago I removed both ovaries from a young married lady, and a great many forceps were used. After removing one ovary and securing the pedicle, the other ovary had to be removed. It had a very short pedicle, and five or six of my torsion-forceps were put on in order to secure the bleeding vessels, while I was tying them separately. I took off, as I thought, every pair of forceps, closed the wound up, and everything seemed quite as it should be. But about two hours after the operation I received a message from a friend who was putting up the instruments for me, to say there was a pair of forceps missing. We knew exactly the number of forceps; if we had not known that, one pair would not have

been missed. This shows how necessary it is always to know how many forceps are taken. It was about five in the afternoon when I had this message: "There was a pair of forceps missing, probably they might be in the patient." Imagine the sort of feeling with which one would receive that intimation. I at once went to the patient. She seemed so well that I did not like to disturb her; there was some doubt where the forceps might be, so I thought I would wait a little longer. I waited till night; she still seemed pretty well, and I thought I would wait till the morning; but in the morning the nurse told me the lady had been very restless. I then made a very careful examination, by the vagina, and rectum, and abdominal wall, to see if I could feel the forceps, but there was nothing to be felt at all. Still I was uneasy, and I thought I had better open the wound. So I asked Mr. Thornton to come with me and throw some carbolic spray over the abdomen, and making some excuse to the patient, just saying I thought it necessary to change the dressing, and it would be as well that she should not feel it, we gave her methylene, removed the dressing, and took out two stitches. I put one finger in, but at first could not feel the forceps. At last I found something hard, put another finger in, and found the forceps wrapped up in the omentum. From the way in which the omentum had insinuated itself into the ring handles of the forceps and between the blades, it was easy to understand how difficult it was to find and remove the instrument; but I did it, returned the omentum, closed the wound, and the patient was none the worse. She got well, and to this day does not know that anything unusual occurred.'

I purposely avoid relating a case (No. 917) where a pair of forceps was found in the bladder of a patient a month after recovery from ovariotomy, as the occurrence is still to me inexplicable.

CHAPTER X.

ON THE REMOVAL OF BOTH OVARIES AT ONE OPERATION

In the chapter on the performance of ovariotomy twice on the same patient particulars will be found of thirteen cases where the patient recovered after the removal of one ovary, after some months or years became the subject of disease in the other ovary, and underwent a second time the operation of ovariotomy. Eleven recovered and two died after this second operation. In that chapter some remarks will be found upon the comparative frequency of disease in one or both ovaries bearing upon the subject of the present chapter; namely, the removal of both ovaries at one operation.

It has been already explained how, after removing one ovarian tumour, the surgeon should search for and examine the other. In the large majority of cases the other ovary is healthy, and should not be disturbed; but occasionally it is more or less enlarged; and it becomes a question whether it should be removed, whether any cysts projecting from its surface should be punctured and their contents squeezed out, or whether it is more prudent to be content with the removal of one ovary, hoping that the other will never increase sufficiently to need surgical interference, or at any rate postponing that interference till after recovery from the first operation. In determining which of these lines of practice to follow, the age of the patient, her conjugal condition, and the ease or difficulty with which the second operation could be performed, are the leading points for consideration.

There can be no doubt that the removal of the second ovary does add to the danger of the single operation. If we deduct from the one thousand, eighty-two cases where both ovaries were removed, this would reduce the number of single opera-

tions to 918 and the deaths to 204, with a mortality of 22·2 per cent. But as of the eighty-two cases of double ovariotomy twenty-eight died, the mortality is 34·14 per cent., or more than 12 per cent. above that of the single cases. This is quite sufficient to show that the surgeon should hesitate, and certainly not remove the second ovary without good reason. I have several times been begged by patients before the operation to remove the second ovary, even if it were healthy and the risk of the operation increased, in order that they might be spared from the possibility of being again subject to similar disease; and medical men have occasionally supported this not unnatural wish of the patient. I have always replied that I should object to the removal of a healthy organ if that removal endangered the success of an operation which was clearly necessary; that as a rule the removal of one ovary would not be followed by disease of the other, that the double operation would necessarily render the woman sterile, and that there might possibly be some consequences of the removal of both ovaries, such as an undue deposit of fat, or obscure nervous symptoms, or some change in feminine physiological peculiarities, which would be objectionable if not directly prejudicial. For these reasons I am of opinion that a healthy ovary should not be removed from any woman at any age, unless Battey's operation has to be considered. This subject will be treated in a subsequent chapter. The amount of apparent disease in an ovary which would justify the removal of the organ may vary with the age and condition of the patient. In a woman past the age of child-bearing a small amount of apparent disease would justify removal of the ovary, whereas a surgeon should hesitate before he condemns a young woman to permanent sterility. It has been suggested that in every woman past the age of child-bearing, if one ovary has to be removed, both should always be taken away to avoid the possibility of recurrence of disease calling for a second ovariotomy. But one would hardly be justified in adding anything to the risk of a first operation on so small a probability as there is of recurrence of non-malignant disease on the other side.

Sometimes during an operation, after removal of one ovary, some slight alteration in the other may be observed, and the question of removal of the second ovary may arise. In many of

my cases this question has arisen. In narrating the 112th case of ovariotomy in my first work on 'Diseases of the Ovaries,' after recording the removal of the right ovary from a young lady aged nineteen, I continue, p. 307 :—

'The left ovary was enlarged to nearly double the normal size. Two follicles, about the size of cherries, were distended by clot. These I laid open, turning out their contents. . . . The operation was peculiar on account of the doubt as to the treatment of the left ovary. I resolved, after consulting with Dr. Greenhalgh (who was assisting me), not to remove it, because—

'*a*. The ligature which would have been necessary would have added seriously to the risk of the operation.

'*b*. It is not certain that *disease* was present in the ovary, or that it would progress, and, if it did, a second ovariotomy could still be done.

'*c*. It seemed hard to unsex a girl of nineteen. Perhaps the clots might have been left alone, but turning them out could do no harm, and might do good.'

This operation was performed in November 1864. The patient recovered well, went into the country four weeks after operation, was married in August 1865, and is now the mother of three girls and a boy, born in September 1866, March 1868, September 1869, and July 1871. Mr. Morgan, who attended her, informed me that all the pregnancies and labours were perfectly natural, and she remains well in 1881.

Of the 82 cases in which both ovaries were removed at one operation, 20 were fifty years of age or more, 18 were between forty and fifty, and 31 were under forty. Forty-three were married, 36 single, and 3 were widows.

Both ovaries removed at same operation.

	Cases	Deaths	Mortality per cent.
In first series	25	11	44
In second series . . .	57	17	29·82
In the 1,000	82	28	34·14

In first series	8 were over 50 years	In second series	. 12 = 20
„	4 between 40 and 50	„	. 14 = 18
„	13 under 40	„	. 31 = 44
			82

	Married	Single	Widow
In first series	17	7	1
In second series	26	29	2
	43	36	3

Of the 14 surviving in the first series 6 are not only alive, but well, in 1881, at the ages of 71, 63, 53, 52, 45, and 31, and they have divided between them 77 years of life and health gained by the operation. Five have died of other diseases after getting about fifteen years of life. Three have made no report.

Of second series 27 are well in 1881 (two married); 17 died after operation, 11 septicæmia, 2 hæmorrhage. 1 exhaustion, 1 abscess; 4 have died of cancer since; and 4 of other diseases since; no reports of 5 since 1876.

In one case there were three ovaries.

The chief point of practical importance in double ovariotomy is the mode of dealing with the pedicle. In the double cases among the first 500 I once secured both pedicles by one clamp, and once used two clamps, one on each pedicle, and kept both clamps outside with no more inconvenience to the patient than if one clamp only had been used, and with a completely successful result. In another case I tried to do this, but the pedicles were too large. I accordingly transfixed them by a large pin and tied both pedicles together behind the pin. The pin thus became a sort of clamp and secured the extra-peritoneal separation of the pedicle. I have also secured one pedicle by a clamp and the other by ligature, fixing the latter to the clamp, in this way conveniently effecting the extra-peritoneal mode of treatment. More than once, after securing one pedicle by a clamp, owing to the absence of a pedicle to the other tumour, I transfixed and tied the attachment, cut the ends of the ligatures off short, and left them in the abdomen. I also treated both ovaries in this manner, and, after tying one or both pedicles, I brought the ligatures out through the wound. The results before adopting complete intra-peritoneal ligature and antiseptic treatment were strongly in favour of the extra-peritoneal method of dealing with both pedicles. Thus of nine cases where both pedicles were fixed outside by one or two clamps, or by applying a clamp on one pedicle and fixing the ligature on the other to the clamp, or using a pin to transfix the pedicles and tying them behind the pin, which thus became a sort of clamp, in either way securing both pedicles outside

the abdominal wall, seven recovered and only two died. Of six cases where the pedicle on one side was kept out by the clamp, and the other pedicle tied, the ligature being left in, four recovered and two died. Of six cases where both pedicles were tied and the ligatures left in, four died and two recovered. Of four cases where the ligatures were brought outside, acting as a drain and keeping the lower angle of the wound open, only one recovered and three died. Of those who recovered, one died two years afterwards of hemiplegia, another two years afterwards of cardiac dropsy, and a third six months after operation of peritoneal cancer. Ten were in good health in 1872.

In 57 double operations in the second series of 500 I used the clamp and ligature ten times—once the clamp alone, and for the other forty-six I put on ligatures.

In the following table, particulars may be found of the thousand cases in which I have completed the operation of ovariotomy, where one or both ovaries have been removed at the same time.

TABLE OF ONE THOUSAND CASES

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
1	Hospital	1858 Feb.	29	Single	Parietal
2	Hospital	,, Aug.	38	Married	Parietal and intestinal
3	Hospital	,, Nov.	33	Married	Omental and intestinal
4	Hospital	1859 Jan.	39	Single	None
5	Hospital	,, May	43	Married	Omental
6	Hospital	,, June	29	Married	Omental and intestinal
7	Hospital	,, June	29	Single	Omental and intestinal
8	Hospital	,, July	47	Married	Parietal and omental
9	Dr. Ridsdale	,, Oct.	41	Married	Omental
10	Mr. Huxtable	,, Oct.	37	Single	Cæcal
11	Hospital	,, Oct.	29	Single	Parietal
12	Mr. Whipple, Plymouth	,, Oct.	38	Married	Parietal and omental
13	Mr. Peirce, Notting Hill	,, Nov.	17	Single	Parietal and omental.
14	Hospital	,, Dec.	27	Single	Parietal and omental
15	Hospital	1860 Jan.	23	Single	Omental
16	Dr. Whitehead, Manchester	,, Feb.	26	Married	None
17	Hospital	,, Feb.	33	Married	Parietal and omental.
18	Dr. Ramskill	,, July	41	Married	Parietal and omental.
19	Dr. Rigby	,, July	36	Single	None
20	Mr. McCrea, Islington	,, Oct.	53	Married	Parietal and omental.
21	Hospital	1861 Jan.	54	Married	Parietal and omental.
22	Dr. Grimsdale, Liverpool	,, March	22	Single	Omental
23	Dr. Bainbridge	,, April	55	Married	Parietal and omental.
24	Hospital	,, April	42	Married	Parietal
25	Hospital	,, June	34	Single	None
26	Hospital	,, July	31	Married	Parietal
27	Hospital	,, Aug.	27	Single	None
28	Dr. Grant	,, Aug.	35	Single	None
29	Dr. West	,, Oct.	54	Married	None
30	Hospital	,, Dec.	50	Single	Parietal

OF COMPLETED OVARIOTOMY

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Ligature . .	26 pounds	3 inches	Recovered	Married. Well in Australia 20 years after operation	1
Ligature . .	31 „	4 „	Recovered	Died 7 years after from cancer	2
Clamp . .	31 „	4 „	Recovered	Died 10 months after of peritoneal cancer	3
Clamp . .	10 „	7 „	Died, 32 hours	Septicæmia	4
Clamp . .	10 „	4 „	Recovered	Well in 1881	5
Clamp . .	7 „	4 „	Died, 2nd day	Peritonitis	6
Clamp . .	?	6 „	Recovered	Well in 1881—still single	7
Clamp. Both ovaries	?	. . .	Recovered	Died 2 years after of hemiplegia	8
Clamp . .	38 „	5 „	Recovered	Girl born 13 months after operation, labour easy—remains well, 1881	9
Clamp . .	19 „	7 „	Died, 4th day	Peritonitis	10
Clamp . .	42 „	4 „	Recovered	Well in 1872—died a few years ago from some other disease	11
Clamp . .	53 „	4 „	Died, 9th day	Tetanus	12
Ligature . .	38 „	4 „	Recovered	Married June 1865—3 boys and 2 girls since, labours all natural. Well in 1881	13
Clamp . .	54 „	4 „	Died, 23 hours	Collapse	14
Clamp and ligature	25 „	5 „	Recovered	Married 1865—1 boy and 1 girl since. Well in 1881	15
Ligature . .	25 „	4 „	Died, 30 hours	Septicæmia	16
Clamp and ligature	31 „	7 „	Died, 46 hours	Intestinal obstruction	17
Pin and ligature	26 „	4 „	Recovered	Well in 1871	18
Pin and ligature	24 „	4 „	Recovered	Married 1878. Well in 1881	19
Pin and ligature	58 „	4 „	Recovered	Health very good in 1881, aged 74	20
Pin and ligature	20 „	6 „	Recovered	No report	21
Pin and ligature	16 „	3 „	Recovered	Married in 1869—3 children—girl 1871, boy 1873, girl 1875. Alive in 1881	22
Pin and ligature	20 „	3 „	Recovered	Died in 1871	23
Pin and ligature	. . .	3 „	Died, 24 hours	Septicæmia	24
Pin and ligature	55 „	6 „	Died, 5th day	Exhaustion	25
Pin and ligature	50 „	5 „	Died, 3rd day	Exhaustion	26
Pin and ligature	44 „	4 „	Recovered	Had child 20 months after operation, labour easy. Well in 1872	27
Clamp . .	17 „	4 „	Recovered	Well in 1881	28
Clamp and ligature	35 „	5 „	Died, 47 hours	Peritonitis	29
Clamp . .	40 „	5 „	Recovered	Operated on a second time, Feb. 5, 1868, and died Oct. 6, 1868, phthisis	30

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
31	Dr. Lawford, Leighton Buzzard	1861 Dec.	46	Married	Parietal and omental
32	Hospital	1862 Jan.	30	Single	Parietal and intestinal
33	Dr. Markham	,, Jan.	47	Married	Omental and intestinal
34	Dr. Whitehead, Manchester	,, Jan.	32	Married	Parietal
35	Hospital	,, May	30	Single	Omental and intestinal
36	Hospital	,, May	41	Married	Parietal and omental
37	Hospital	,, June	35	Married	Omental
38	Dr. West	,, June	28	Single	None
39	Hospital	,, June	25	Married	Parietal
40	Hospital	,, July	20	Single	Parietal and omental
41	Hospital	,, July	41	Single	Parietal and omental
42	Dr. Cahill, Brompton	,, Sept.	49	Single	Parietal
43	Hospital	,, Oct.	24	Single	None
44	Hospital	,, Oct.	56	Married	Parietal and omental
45	Hospital	,, Oct.	43	Single	None
46	Dr. Walshe	,, Nov.	32	Single	None
47	Dr. Hawksley	,, Nov.	23	Single	None
48	Hospital	,, Nov.	50	Married	Parietal and omental
49	Dr. Grimsdale, Liverpool	,, Nov.	25	Single	Parietal
50	Hospital	,, Nov.	17	Single	Parietal and omental
51	Hospital	,, Dec.	42	Married	Parietal and omental
52	Dr. Martin, Rochester	,, Dec.	53	Single	None
53	Hospital	1863 Jan.	34	Married	Parietal
54	Sir T. Watson	,, Feb.	25	Single	Parietal and omental
55	Hospital	,, Feb.	56	Married	Parietal
56	Hospital	,, March	36	Single	Parietal
57	Dr. Hare	,, March	29	Single	Parietal
58	Hospital	,, March	36	Single	None
59	Dr. Cooper, Brentford	,, March	26	Single	None
60	Hospital	,, March	26	Married	Parietal and intestinal
61	Hospital	,, April	61	Married	Parietal and intestinal
62	Hospital	,, April	19	Single	None
63	Dr. Dyce, Aberdeen	,, April	37	Married	Parietal, omental, and intestinal
64	Dr. Churchill, Dublin	,, May	33	Married	None
65	Hospital	,, June	50	Married	Parietal and omental
66	Hospital	,, June	44	Married	Parietal
67	Dr. Dyce, Aberdeen	,, June	37	Married	Parietal and omental
68	Dr. Llewellyn Williams	,, June	29	Single	None
69	Dr. F. Bird	,, June	54	Single	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp	27 pounds	9 inches	Died, 13th day	Peritonitis	31
Wire Clamp	. . .	5 „	Died, 30 hours	Diffuse peritonitis	32
Clamp	30 „	5 „	Died, 5th day	Exhaustion	33
Clamp	40 „	5 „	Died, 3rd day	Septicæmia	34
Clamp	. . .	5 „	Died, 13th day	Tetanus	35
Clamp	. . .	5 „	Recovered	Died of spinal meningitis, July 1868	36
Clamp	. . .	5 „	Recovered	Well in 1872. No report since	37
Écraseur	. . .	5 „	Recovered	Married 1863—1st child born 1864, 2nd 1866, 3rd 1868. Uterine fibroid removed June 1869; died third day	38
Ligature	. . .	5 „	Recovered	Married April 1861—no child. Well in 1881	39
Clamp	40 „	6 „	Recovered	Married July 1867, and again Aug. 1870. Well in 1881 after death of her third husband. Children born in 1871 and 1872	40
Clamp	. . .	5 „	Recovered	Well and single in 1881	41
Clamp	. . .	6 „	Recovered	Well and single in 1872. No report since	42
Clamp	7 „	3 „	Recovered	Was tapped per vag. Aug. 1864. Well and single in 1872, died in 1874	43
Clamp	25 „	5 „	Recovered	Died 1869 of bronchitis	44
Clamp	. . .	5 „	Died, 40 hours	Peritonitis, with fatty liver and enlarged spleen	45
Clamp	. . .	4 „	Recovered	Well in 1881—single—menses regular.	46
Clamp	. . .	4 „	Recovered	No report	47
Clamp	. . .	5 „	Recovered	Died Nov. 1881 in her 74th year of heart disease	48
Clamp	. . .	4 „	Recovered	Married 1880 in America. Well in 1881	49
Clamp	. . .	4 „	Recovered	Well in 1870. No report since	50
Clamp	. . .	4 „	Recovered	Health good in 1881	51
Clamp	. . .	5 „	Recovered	Well and single in 1881	52
Clamp	72 „	6 „	Recovered	Boy born April 1864; girl 1865—labours natural. Well in 1881	53
Clamp	30 „	5 „	Died, 44 hours	Diffuse peritonitis	54
Clamp	. . .	4 „	Recovered	Well in 1872. No report since	55
Clamp	36 „	6 „	Recovered	Well in 1872, since dead	56
Clamp	48 „	5 „	Recovered	Well and single in 1881	57
Clamp	15 „	5 „	Recovered	No report	58
Clamp	30 „	6 „	Died, 27th day	Pyæmic pleurisy	59
Ligature	. . .	4 „	Died, 54 hours	Septicæmia	60
Clamp	. . .	5 „	Recovered	Died Aug. 1863 of cancer	61
Clamp	16 „	4 „	Recovered	Married 1869; girl born August 1870, labour natural; well and pregnant in 1872. No further report	62
Clamp	47 „	9 „	Recovered	Died of diffuse cancer in 3 months	63
Clamp	20 „	4 „	Recovered	Boys born July 1865 and Sept. 1867, labours natural. Well in 1881	64
Clamp	36 „	6 „	Died, 54 hours	Fibrinous clot in heart	65
Clamp	38 „	6 „	Recovered	Well in 1881	66
Clamp	. . .	6 „	Died, 80 hours	Exhaustion	67
Clamp	. . .	4 „	Recovered	Married Nov. 1868. Boy still-born at 6 months May 1869; girl July 1870. Well in 1881	68
Clamp	. . .	4 „	Recovered	Well and single in 1881	69

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
70	Hospital	1863 June	49	Married	Parietal and intestinal
71	Hospital	„ July	35	Single	None
72	Mr. Baker, Birmingham	„ July	35	Single	None
73	Dr. Symonds, Clifton	„ Aug.	55	Single	None
74	Dr. Gordon, Dublin	„ Aug.	24	Single	None
75	Dr. Hutton, Dublin	„ Sept.	35	Single	None
76	Hospital	„ Oct.	35	Married	Omental
77	Hospital	„ Oct.	23	Single	Parietal
78	Hospital	„ Nov.	33	Single	Parietal
79	Hospital	„ Nov.	32	Single	None
80	Dr. Fox	„ Nov.	19	Single	None
81	Hospital	„ Nov.	33	Married	Omental
82	Sir E. Hilditch	„ Dec.	57	Married	Intestinal
83	Dr. Cahill	„ Dec.	36	Married	None
84	Mr. Stretton, Beverley	1864 Feb.	23	Single	None
85	Hospital	„ Feb.	41	Married	Omental
86	Dr. Playfair	„ March	57	Married	Omental and pelvic
87	Hospital	„ March	23	Single	None
88	Dr. Collet, Worthing	„ March	43	Single	Parietal
89	Dr. Pickford, Brighton	„ April	23	Single	None
90	Hospital	„ April	32	Married	None
91	Dr. Farre	„ April	45	Married	Parietal
92	Hospital	„ April	50	Married	Parietal and omental
93	Sir T. Watson	„ April	21	Single	None
94	Mr. Carden, Worcester	„ April	40	Married	Parietal
95	Hospital	„ May	47	Married	None
96	Sir W. Gull	„ May	46	Single	None
97	Mr. Ridsdale	„ May	40	Single	Parietal
98	Dr. Brown, Haverfordwest	„ May	36	Married	None
99	Hospital	„ May	23	Single	Parietal
100	Hospital	„ June	54	Married	None
101	Hospital	„ June	18	Single	Parietal and omental
102	Hospital	„ July	24	Single	Omental
103	Mr. Picken, Croydon	„ July	28	Married	Parietal and pelvic
104	Sir J. G. Simpson	„ July	32	Married	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	. . .	. . .	Recovered	Well in 1872	70
Clamp and ligature	21 pounds	4 „	Died, 78 hours	Clot in heart	71
Clamp . .	. . .	4 „	Died, 44 hours	Exhaustion	72
Clamp . .	. . .	. . .	Recovered	Well and single in 1881	73
Clamp . .	. . .	4 „	Died, 82 hours	Peritonitis	74
Clamp . .	16 „	5 „	Died, 40 hours	Peritonitis	75
Clamp . .	. . .	7 „	Recovered	No report	76
Clamp . .	. . .	8 „	Recovered	Married since—six children. Well in 1881	77
Clamp . .	. . .	4 „	Died, 8th day	Peritonitis	78
Clamp . .	17 „	4 „	Recovered	Well and single in 1881, but with enlarged abdomen	79
Ligature . .	. . .	4 „	Recovered	Married 1864. Girls born 1865 and 1867; boy 1870; labours natural. Well in 1872. No report since	80
Ligature . .	44 „	5 „	Died, 8th day	Septicæmia	81
Ligature . .	. . .	5 „	Died, 3rd day	Peritonitis	82
Ligature. Both ovaries	. . .	5 „	Died, 3rd day	Crural phlebitis and septicæmia	83
Clamp . .	16 „	4 „	Recovered	Married 1867. Seven children, one girl, six boys—born 1868-69-70-71-73-78-79. Miscarriages—Dec. 1879, June 1880 of twins. Now pregnant and well, Nov. 1881	84
Clamp . .	7 „	9 „	Recovered	Well in 1881	85
Ligature . .	40 „	5 „	Recovered	Died 1866 of pelvic abscess and fæcal fistula	86
Clamp and ligature	12 „	4 „	Recovered	Well and single in 1872	87
Clamp . .	15 „	6 „	Recovered	Died 1875, eleven years after operation	88
Clamp . .	29 „	4 „	Died, 114 hours	Tubercular peritonitis	89
Clamp . .	14 „	3 „	Recovered	No report	90
Clamp . .	59 „	6 „	Recovered	Well in 1881	91
Ligature . .	34 „	8 „	Died, 64 hours	Peritonitis	92
Ligature . .	. . .	3 „	Recovered	Well and single in 1881	93
Clamp . .	18 „	6 „	Recovered	Well and widow in 1872. No report since	94
Ligature . .	. . .	5 „	Recovered	Well in 1870	95
Ligature . .	25 „	6 „	Died, 44 hours	Peritonitis	96
Ligature . .	14 „	7 „	Died, 67 hours	Septicæmia	97
Clamp . .	16 „	4 „	Recovered	Girl born since operation. Craniotomy necessary. Well in 1881	98
Clamp . .	28 „	4 „	Recovered	Well and single in 1871. No report since	99
Clamp and ligature. Both ovaries	. . .	4 „	Recovered	Health excellent in 1881	100
Ligature . .	12 „	4 „	Recovered	Married July 1868—no child. Died of tuberculosis, July 1872	101
Ligature . .	20 „	8 „	Died, 4th day	Fibrinous clot in heart and pulmonary artery	102
Ligature . .	18 „	4 „	Died, 29th day	Chronic peritonitis	103
Clamp . .	17 „	4 „	Recovered	Husband died; married again; two children by second husband. Died of bronchitis, 1879	104

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
105	Mr. Savile, Rotherham	1864 July	41	Single	None
106	Hospital	,, July	35	Single	Omental
107	Mr. Carden, Worcester	,, Oct.	44	Married	Parietal. Burst cyst
108	Dr. Ramsbotham	,, Nov.	42	Single	Parietal
109	Hospital	,, Nov.	59	Married	None
110	Dr. De Mussy	,, Nov.	49	Married	Omental
111	Mr. Square, Plymouth	,, Nov.	45	Single	Parietal
112	Dr. Greenhalgh	,, Nov.	19	Single	None
113	Sir T. Watson	,, Nov.	51	Single	Omental and intestinal. Burst cyst
114	Hospital	,, Nov.	34	Single	None
115	Mr. Savory, Stoke Newington	,, Dec.	33	Married	Omental
116	Hospital	,, Dec.	21	Single	None
117	Hospital	,, Dec.	27	Single	None
118	Hospital	1865 Jan.	42	Single	None
119	Dr. Credé, Leipzig	,, Jan.	19	Single	Parietal and omental
120	Dr. Evans, Hertford	,, Jan.	54	Married	Parietal and omental
121	Mr. Wright, Nottingham	,, Feb.	27	Single	Parietal
122	Hospital	,, Feb.	24	Single	Parietal, pelvic, and omental
123	Hospital	,, Feb.	50	Married	Parietal and omental
124	Mr. Forster, Daventry	,, March	36	Married	None
125	Hospital	,, March	25	Single	None
126	Hospital	,, April	31	Married	Omental
127	Hospital	,, April	41	Married	Parietal
128	Hospital	,, May	33	Married	Parietal and omental
129	Dr. Farre	,, May	38	Married	Parietal and omental
130	Hospital	,, June	56	Single	Parietal
131	Dr. Whitehead, Manchester	,, June	56	Married	Parietal, omental, and intestinal
132	Mr. Hodgson	,, June	34	Single	None
133	Mr. May, Crosby	,, June	54	Married	Parietal and omental
134	Dr. Beatty, Dublin	,, June	37	Married	Parietal and intestinal
135	Hospital	,, July	41	Married	Omental
136	Dr. Breslau, Zurich	,, July	45	Married	Parietal and omental
137	Hospital	,, July	41	Married	None
138	Hospital	,, July	55	Married	Parietal
139	Hospital	,, Aug.	24	Married	Omental. Pregnant uterus
140	Dr. Bullen	,, Oct.	46	Married	Parietal and omental

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	11 pounds	4 inches	Recovered	Well and single in 1872. No report since	105
Clamp . .	18 „	4 „	Recovered	Married May 1870; no children—swelling on right side of abdomen. Well in 1872. No report since	106
Ligature . .	26 „	5 „	Died, 11th day	Septic peritonitis	107
Clamp . .	28 „	8 „	Recovered	No report, gone away	108
Clamp . .	20 „	4 „	Recovered	Well in 1872. No report since	109
Ligature. Both ovaries	36 „	7 „	Recovered	Well in 1872; died in 1879 of abdominal disease	110
Clamp . .	16 „	5 „	Recovered	Died in six weeks of cancer	111
Clamp . .	15 „	4 „	Recovered	Married 1865. Girls born 1866, 1868, 1869; boy July 1871; two children since—labours natural. Well in 1881	112
Clamp . .	50 „	10 „	Died, 3rd day	Exhaustion	113
Clamp . .	35 „	9 „	Recovered	Well and single in 1872	114
Clamp . .	20 „	5 „	Recovered	No report	115
Clamp . .	10 „	4 „	Died, 4th day	Septic peritonitis	116
Ligature . .	15 „	7 „	Recovered	Married 1872. Three girls 1873–74–78. Well in 1881	117
Clamp . .	28 „	7 „	Recovered	Well and single in 1881	118
Clamp . .	15 „	6 „	Recovered	No report	119
Clamp . .	46 „	7 „	Recovered	Well in 1881	120
Clamp . .	33 „	7 „	Recovered	Well and single in 1881	121
Clamp . .	28 „	5 „	Recovered	Recovered after second ovariotomy in 1866—died 1868 of pneumonia	122
Clamp . .	20 „	6 „	Died, 5th day	Peritonitis	123
Clamp . .	27 „	8 „	Recovered	Well in 1881	124
Clamp . .	32 „	5 „	Recovered	Married June 1869; two children—labours natural. Well in 1872. No report in 1881	125
Clamp and ligature	45 „	20 „	Died, 27 hours	Exhaustion	126
Clamp . .	27 „	5 „	Recovered	Died in 1869 of scirrhus of rectum	127
Ligature . .	23 „	8 „	Recovered	No report	128
Clamp . .	27 „	5 „	Recovered	Well in 1881	129
Ligature . .	30 „	5 „	Recovered	Died of some other disease in spring of 1870	130
Ligature. Both ovaries	23 „	7 „	Died, 30 hours	Exhaustion	131
Clamp . .	60 „	4 „	Recovered	Well in 1881; married in 1870. Husband dead—no child	132
Ligature . .	33 „	5 „	Died, 5th day	Septicæmia	133
Ligature. Both ovaries	. . .	5 „	Recovered	Very well in 1881; no child since operation	134
Clamp . .	. . .	8 „	Died, 4th day	Peritonitis	135
Clamp . .	48 „	8 „	Recovered	Very well in 1881	136
Clamp . .	. . .	5 „	Recovered	No report; gone away	137
Clamp . .	75 „	5 „	Died, 9th day	Peritonitis	138
Clamp. Uterine ligatures	28 „	4 „	Recovered	Well in 1881	139
Clamp . .	. . .	5 „	Recovered	Health good in 1872; widow since operation	140

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
141	Dr. Allen, Leeds	1865 Oct.	53	Married	None
142	Dr. Walker, Peterborough	,, Oct.	59	Married	Parietal and intestinal
143	Hospital	,, Oct.	34	Single	Parietal
144	Hospital	,, Nov.	42	Single	Parietal
145	Dr. Martin, Rochester	,, Nov.	31	Single	None
146	Dr. Tapson, Clapham	,, Nov.	30	Single	Parietal and omental
147	Hospital	,, Nov.	41	Married	Parietal
148	Dr. Hope, Boulogne	,, Dec.	50	Married	Broad ligament
149	Mr. Fuller	,, Dec.	35	Married	Parietal
150	Hospital	,, Dec.	15	Single	None
151	Hospital	,, Dec.	44	Single	None
152	Dr. Budd	1866 Jan.	25	Single	Parietal
153	Hospital	,, Jan.	20	Single	Parietal and omental
154	Mr. Earle, Brentwood	,, Jan.	29	Married	None
155	Hospital	,, Jan.	39	Married	Omental
156	Mr. Baker, Birmingham	,, Feb.	37	Single	None
157	Hospital	,, Feb.	32	Single	Parietal
158	Dr. West	,, Feb.	34	Married	Parietal, omental and intestinal
159	Hospital	,, March	26	Married	Parietal. Cyst suppurating
160	Mr. Carden, Worcester	,, March	31	Single	None. Burst cyst
161	Dr. Burkitt	,, March	30	Single	Parietal, omental and mesenteric
162	Hospital	,, March	23	Single	Parietal
163	Hospital	,, March	24	Single	None
164	Dr. Symonds, Clifton	,, April	27	Single	None
165	Hospital	,, April	46	Married	Omental
166	Dr. Priestley	,, May	42	Married	Parietal and omental
167	Hospital	,, May	52	Married	Parietal and omental
168	Mr. Leggatt	,, May	32	Single	None
169	Dr. Bowles, Folkestone	,, May	57	Single	Parietal and omental
170	Mr. Woodman	,, June	24	Single	None
171	Mr. Roberts, Ruabon	,, July	50	Married	Parietal
172	Mr. Wrench, Baglow	,, July	25	Married	Parietal and omental
173	Hospital	,, July	45	Married	Parietal
174	Mr. Haynes, Walton	,, July	28	Married	Parietal, omental and intestinal
175	Mr. Yate, Godalming	,, July	30	Married	Parietal and omental
176	Dr. Budd, Clifton	,, July	32	Married	None
177	Dr. Drysdale, R.A.	,, July	39	Married	None
178	Hospital	,, Aug.	22	Single	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Ligature . .	24 pounds	5 inches	Recovered	Very well in 1872	141
Ligature and cautery	. . .	5 „	Died, 46 hours	Exhaustion	142
Clamp . .	30 „	5 „	Recovered	Very well—married since operation; 'expected to be confined in July 1872.' No report since	143
Clamp . .	30 „	5 „	Recovered	Very well in 1881. Single; menses regular	144
Ligature . .	. . .	5 „	Recovered	Married March 1869. Boy still-born at five months, 1869; two more still-born since—girl 1871—boy 1875—labours easy. Well in 1881	145
Ligature . .	28 „	5 „	Recovered	Died of pneumonia, March 1866	146
Clamp . .	. . .	4 „	Recovered	Had a child since operation. Well in 1881	147
Ligature. Both ovaries	34 „	5 „	Died, 22nd day	Peritonitis	148
Clamp and ligature	40 „	5 „	Recovered	Recovered after second ovariotomy, in 1876. Well in 1881	149
Clamp . .	31 „	6 „	Recovered	Married 1875. Well in 1881	150
Clamp . .	24 „	5 „	Recovered	Died of cancer of rectum, Feb. 1867	151
Clamp . .	17 „	6 „	Recovered	Well and single in 1881	152
Clamp . .	22 „	4 „	Recovered	Married since; gone away	153
Ligature . .	16 „	4 „	Died, 7th day	Peritonitis and clot in heart	154
Clamp . .	9 „	8 „	Died, 12th day	Septicæmia—cancer	155
Clamp and ligature	52 „	6 „	Recovered	Died in 1880	156
Clamp . .	20 „	6 „	Recovered	Well and single in 1881	157
Clamp . .	7 „	4 „	Recovered	Well in 1881—no children	158
Clamp . .	8 „	5 „	Died, 25 hours	Pyæmic fever	159
Clamp . .	30 „	6 „	Died, 26 hours	Exhaustion	160
Ligature . .	24 „	5 „	Died, 35 hours	Peritonitis	161
Clamp . .	69 „	4 „	Died, 52 hours	Pulmonary embolism	162
Ligature . .	16 „	7 „	Recovered	Well and single in 1872. No report since	163
Clamp . .	16 „	7 „	Died, 4th day	Peritonitis	164
Clamp . .	14 „	8 „	Recovered	Health good in 1872. No report since	165
Clamp . .	25 „	5 „	Recovered	Well in 1881	166
Clamp . .	25 „	8 „	Died, 4th day	Peritonitis	167
Ligature . .	16 „	5 „	Recovered	Well and single in 1881	168
Clamp . .	15 „	7 „	Recovered	Health good in 1881	169
Cautery . .	28 „	4 „	Recovered	Well and single in 1881	170
Cautery . .	23 „	4 „	Recovered	Health good in 1872. No report since	171
Cautery . .	15 „	7 „	Died, 4th day	Septicæmia	172
Cautery and ligature	17 „	7 „	Recovered	Well in 1872; husband dead. No report since	173
Clamp . .	28 „	8 „	Recovered	Well in 1872. No report since	174
Ligature . .	23 „	4 „	Recovered	Girls born 1869 and 1874; labours natural. Well in 1881	175
Clamp . .	13 „	6 „	Recovered	Well in 1881; large fibroid uterus	176
Clamp . .	25 „	5 „	Recovered	Child born March 1868. Well in 1872. No report since	177
Clamp . .	. . .	4 „	Recovered	Married 1869; girls born 1870 and 1871 — labours natural. Well in 1872. No report in 1881	178

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
179	Hospital	1866 Aug.	59	Married	Parietal and intestinal
180	Dr. Woakes, Luton	„ Aug.	42	Single	Parietal
181	Dr. Playfair	„ Aug.	40	Married	None
182	Mr. Clifton, Islington	„ Aug.	53	Married	Parietal
183	Dr. Savage	„ Oct.	48	Single	Omental and intestinal
184	Hospital	„ Oct.	37	Married	Omental and intestinal
185	Dr. Arthur	„ Oct.	48	Married	Omental
186	Dr. Kingsley, Stratford-on-Avon	„ Oct.	43	Married	Broad ligament
187	Mr. Johnson, Croydon	„ Oct.	21	Single	None
188	Dr. Gream	„ Oct.	28	Single	None
189	Dr. Hassall, Richmond	„ Oct.	32	Married	Omental
190	Hospital	„ Nov.	37	Married	None
191	Dr. Monckton, Maidstone	„ Nov.	50	Married	None
192	Mr. Freer, Stourbridge	„ Nov.	36	Single	None
193	Dr. Traill	„ Dec.	52	Married	Parietal and omental
194	Hospital	„ Dec.	31	Married	Parietal and omental
195	Mr. Turner	„ Dec.	55	Married	Parietal, omental and intestinal
196	Mr. Love, Wimbledon	„ Dec.	28	Married	Parietal, omental and intestinal
197	Hospital	1867 Jan.	34	Married	None
198	Dr. Gream	„ Feb.	34	Married	None
199	Dr. Farre	„ Feb.	39	Married	Omental
200	Dr. Farre	„ March	38	Married	None
201	Mr. Illingworth	„ March	40	Single	None
202	Mr. Wakefield	„ March	27	Single	None
203	Hospital	„ March	47	Married	Parietal
204	Dr. Hingston, Plymouth	„ March	43	Single	None
205	Hospital	„ March	35	Single	Extensive
206	Mr. Shipman, Grantham	„ April	43	Married	Parietal
207	Dr. Graily Hewitt	„ April	43	Married	Parietal
208	Hospital	„ May	31	Single	Parietal
209	Hospital	„ May	29	Married	Parietal
210	Mr. Marsack, Tunbridge Wells	„ May	40	Married	None
211	Hospital	„ May	53	Married	None
212	Mr. C. Reade, Clifton	„ May	37	Single	Ruptured adherent cyst
213	Hospital	„ June	33	Widow	None
214	Mr. Tapson	„ June	57	Single	Parietal, omental and intestinal

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of death	No.
Clamp . .	. . .	5 inches	Recovered	Weak; otherwise quite well in 1872. No report since	179
Clamp . .	21 pounds	4 „	Recovered	Well and single in 1872. No report since	180
Cautery and ligature	33 „	7 „	Convalescent	Died a month after of peritonitis from an accident	181
Clamp . .	28 „	5 „	Recovered	Remained well till 1871, when she died of some other disease	182
Clamp . .	28 „	5 „	Recovered	Well in 1874. No report, 1881	183
Clamp . .	29 „	9 „	Recovered	Well in 1871. No report since	184
Cautery . .	18 „	7 „	Died, 5th day	Peritonitis	185
Cautery and ligature	36 „	6 „	Recovered	Health good in 1881	186
Cautery and ligature	20 „	6 „	Recovered	Married 1869; had miscarriage 1871. Well in 1872. No report since	187
Clamp . .	14 „	5 „	Recovered	Well and single in 1881	188
Ligature . .	44 „	9 „	Died, 42 hours	Peritonitis	189
Clamp . .	24 „	4 „	Recovered	Health very good in 1881; widow since operation	190
Clamp . .	23 „	4 „	Recovered	Very well in 1881; slight hernial protrusion in cicatrix	191
Clamp . .	14 „	4 „	Recovered	Married since operation; girl born 1869—labour lingering. Well in 1881	192
Clamp and ligature	32 „	6 „	Recovered	Died in 1877, kidney disease	193
Clamp . .	22 „	10 „	Died, 33 hours	Peritonitis	194
Clamp . .	15 „	6 „	Died, 76 hours	Septicæmia	195
Clamp . .	28 „	5 „	Died, 5th day	Pyæmic fever	196
Cautery and ligature	12 „	4 „	Died, 4th day	Peritonitis	197
Clamp . .	17 „	5 „	Recovered	Died a year afterwards of renal disease	198
Cautery and ligature	25 „	7 „	Recovered	Well in 1881	199
Clamp . .	28 „	6 „	Recovered	Boys born 1868 and 1870—labours natural. Well in 1881	200
Cautery . .	14 „	5 „	Recovered	Well in 1872	201
Cautery and ligature	16 „	5 „	Recovered	Married 1871; one child born May 1872—labour natural, two abortions since. Well 1874	202
Clamp . .	25 „	5 „	Recovered	Health good in 1881	203
Cautery . .	14 „	6 „	Recovered	Well and single in 1881	204
Ligature returned	23 „	6 „	Died, 20th day	Obstructed intestine	205
Clamp . .	32 „	5 „	Recovered	Very well in 1881	206
Clamp . .	14 „	6 „	Recovered	Died in 1870 of anæmia	207
Clamp . .	37 „	5 „	Recovered	Well and single in 1881	208
Clamp . .	38 „	5 „	Recovered	Well in 1872. No report since	209
Clamp . .	18 „	5 „	Recovered	Child born 1868. Well in 1872. No report since	210
Clamp . .	14 „	5 „	Recovered	Died July 1871, of cardiac disease, with dropsy	211
Clamp . .	42 „	5 „	Recovered	Very well and single in 1872. No report since	212
Clamp . .	52 „	4 „	Recovered	No report	213
Clamp . .	15 „	5 „	Died, 42 hours	Exhaustion	214

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
215	Hospital	1867 June	52	Married	Parietal
216	Sir G. Burrows	„ June	35	Married	None
217	Dr. Southey	„ June	39	Single	Parietal
218	M. Nélaton	„ June	42	Married	Omental
219	Dr. Sharpe, Norwood	„ June	38	Single	Parietal and intestinal
220	Hospital	„ July	50	Single	Parietal
221	Hospital	„ July	56	Married	None
222	Dr. Priestley	„ July	59	Widow	None
223	Hospital	„ July	51	Married	None
224	Hospital	„ July	53	Married	Parietal and omental
225	Hospital	„ Aug.	25	Married	Pelvic
226	Dr. Symonds, Clifton	„ Aug.	41	Widow	None
227	Dr. Grasemann	„ Aug.	25	Single	None
228	Mr. Franks, Sevenoaks	„ Aug.	27	Single	Parietal
229	Mr. Woolner	„ Oct.	27	Married	Parietal
230	Dr. Bowles, Folkestone	„ Oct.	52	Married	None
231	Dr. Budd, Clifton	„ Oct.	56	Single	Parietal
232	Hospital	„ Oct.	40	Married	Omental
233	Dr. West	„ Oct.	40	Single	None
234	Hospital	„ Nov.	42	Single	Parietal
235	Hospital	„ Nov.	46	Married	Parietal and omental
236	Dr. Whitehead, Manchester	„ Nov.	51	Married	Omental
237	Mr. Kesteven	„ Nov.	34	Married	Parietal
238	Hospital	„ Nov.	23	Single	Parietal and omental
239	Hospital	„ Nov.	30	Married	Parietal
240	Hospital	„ Dec.	25	Single	None
241	Hospital	„ Dec.	51	Married	Intestinal
242	Mr. E. P. Young	„ Dec.	40	Single	Parietal and omental
243	Dr. De Mussy	„ Dec.	41	Single	Parietal
244	Hospital	„ Dec.	23	Single	Parietal and omental
245	Hospital	1868 Jan.	22	Single	None
246	Hospital	„ Jan.	48	Married	None
247	Dr. Cleveland	„ Jan.	25	Single	Parietal
248	Hospital	„ Jan.	34	Single	None
249	Hospital	„ Jan.	32	Married	Parietal and omental
250	Hospital	„ Feb.	33	Single	Intestinal
251	Hospital	„ Feb.	30	Single	Parietal
252	Mr. Smith, Battle	„ Feb.	50	Married	Parietal

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	17 pounds	4 inches	Recovered	Well in 1872. No report since	215
Clamp . .	16 „	5 „	Recovered	Well in 1881	216
Clamp . .	26 „	5 „	Recovered	Pretty good health in 1881. Single	217
Clamp . .	28 „	8 „	Recovered	Very well in 1881	218
Clamp . .	19 „	5 „	Recovered	Health excellent in 1881. Still single	219
Clamp . .	27 „	5 „	Recovered	Died Dec. 1868 of delirium tremens	220
Clamp . .	5 „	4 „	Recovered	Well in 1881	221
Clamp . .	40 „	6 „	Recovered	Very well in 1881	222
Clamp . .	13 „	4 „	Died, 8th day	Peritonitis	223
Clamp . .	41 „	6 „	Died, 8th day	Peritonitis	224
Cautery . .	12 „	4 „	Recovered	Very well in 1872. Boys born 1869, 1870, and 1872—labours natural. No report since	225
Cautery . .	11 „	4 „	Recovered	Very well in 1881	226
Cautery . .	13 „	4 „	Recovered	Well and single in 1881	227
Cautery . .	16 „	5 „	Recovered	Well and single in 1881	228
Cautery and ligatures	40 „	5 „	Died, 51 hours	Septicæmia	229
Cautery and ligatures	18 „	4 „	Recovered	Died 1879 of paralysis	230
Cautery . .	6 „	4 „	Recovered	Well in 1881	231
Clamp . .	32 „	5 „	Recovered	Very well in 1875. Not seen since. Husband dead. No child since operation	232
Cautery and ligatures	18 „	4 „	Recovered	Well and single in 1881	233
Clamp . .	30 „	5 „	Recovered	Well and single in 1881	234
Clamp . .	15 „	5 „	Recovered	Well in 1881	235
Ligature . .	9 „	7 „	Died, 13th day	Cardiac embolism and carcinoma	236
Clamp . .	20 „	5 „	Recovered	Well in 1881. Has had two children since operation	237
Clamp . .	19 „	5 „	Recovered	Married—three children—well in 1881	238
Clamp . .	10 „	5 „	Recovered	Boy born 1869—labour lingering but natural. Well in 1872	239
Clamp . .	10 „	4 „	Recovered	Well and single in 1872. Believed to be dead 1881	240
Cautery . .	11 „	5 „	Recovered	Very well in 1881	241
Clamp . .	16 „	5 „	Recovered	Very well and single in 1881	242
Clamp . .	24 „	5 „	Recovered	Well in 1881	243
Clamp . .	21 „	7 „	Recovered	Very well. Married Jan. 1872, and was pregnant in May 1872	244
Clamp . .	26 „	4 „	Recovered	Pretty well in 1872; suffers from dysmenorrhœa. No report since	245
Cautery and ligatures	14 „	4 „	Died, 5th day	Exhaustion	246
Cautery and ligatures	11 „	5 „	Recovered	Health good. Married 1870. Girls born 1870 and 1872—labours natural. No report since	247
Clamp . .	25 „	5 „	Recovered	Health good in 1872. Married June 1869; no child	248
Clamp . .	46 „	7 „	Recovered	No report	249
Ligature . .	11 „	5 „	Died, 4th day	Peritonitis	250
Clamp . .	16 „	5 „	Recovered	Married 1870—had twins 1871—labour natural. Well in 1872	251
Clamp . .	21 „	5 „	Recovered	Health good in 1881; small hernia through cicatrix	252

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
253	Hospital	1868 March	33	Single	None
254	Dr. Buckall, Chichester	„ March	34	Married	Parietal and omental
255	Mr. Morris, Edmonton	„ March	54	Married	None
256	Hospital	„ March	38	Widow	Omental
257	Hospital	„ March	28	Single	Omental
258	Mr. Nunn	„ March	34	Married	Parietal, omental and intestinal
259	Mr. Crompton, Birmingham	„ March	62	Married	None
260	Dr. Tilt	„ March	50	Single	Parietal
261	Hospital	„ April	39	Widow	Parietal
262	Hospital	„ April	20	Single	Parietal and omental
263	Hospital	„ April	42	Married	Parietal
264	Dr. E. Ellis	„ April	54	Single	Parietal and omental
265	Hospital	„ May	50	Widow	Parietal
266	Hospital	„ May	39	Widow	None. Ruptured cyst
267	Mr. Mason, Surbiton	„ May	43	Married	Parietal, intestinal, and pelvic
268	Dr. Pocock, Brixton	„ May	24	Married	Parietal and omental
269	Hospital	„ May	32	Single	None
270	Hospital	„ June	23	Single	None
271	Hospital	„ June	42	Married	None
272	Dr. Redlich, Moscow	„ June	57	Widow	Parietal
273	Hospital	„ June	49	Single	Parietal
274	Hospital	„ July	45	Widow	Parietal and omental
275	Hospital	„ July	27	Married	None
276	Hospital	„ July	35	Married	Parietal and omental
277	Hospital	„ July	52	Married	Parietal
278	Mr. Wright, Clapham Road	„ Aug.	48	Single	Parietal
279	Hospital	„ Oct.	46	Single	Parietal
280	Dr. J. Clarke	„ Oct.	41	Married	None
281	Hospital	„ Oct.	47	Widow	Parietal and omental
282	Hospital	„ Oct.	16	Single	Parietal and omental
283	Dr. Morris	„ Oct.	39	Single	Parietal and omental
284	Hospital	„ Oct.	35	Single	Parietal
285	Dr. Grenser, Dresden	„ Oct.	28	Single	None
286	Dr. Roberts, Manchester	„ Oct.	36	Married	Omental
287	Hospital	„ Oct.	53	Married	Parietal, omental and intestinal
288	Hospital	„ Oct.	45	Widow	Parietal and omental

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	19 pounds	6 inches	Recovered	Married June 1868—had child. Well in 1872. No report since	253
Clamp . .	20 „	5 „	Recovered	Health good in 1869. Girl born 1870—labour natural	254
Clamp . .	19 „	5 „	Recovered	Well in 1872. No report since	255
Clamp . .	28 „	5 „	Recovered	No report	256
Clamp . .	19 „	5 „	Recovered	Well in 1872. No report since	257
Ligature . .	50 „	6 „	Died, 48 hours	Exhaustion	258
Clamp . .	20 „	3 „	Recovered	Well in 1881	259
Clamp . .	7 „	4 „	Recovered	Well in 1871. No report since	260
Clamp . .	18 „	4 „	Recovered	Very well in 1872. No report since	261
Clamp . .	32 „	4 „	Recovered	Married in April 1872. Three children 1873-74-76. Well in 1881	262
Clamp . .	21 „	4 „	Recovered	Died, 1877—disease of bladder	263
Pins and ligatures—both ovaries removed	30 „	5 „	Died, 80 hours	Peritonitis	264
Clamp and ligatures—both ovaries removed	32 „	5 „	Recovered	Health perfect in 1881	265
Clamp . .	25 „	5 „	Recovered	Died of cardiac dropsy, Aug. 1869	266
Ligatures .	24 „	6 „	Died, 2 hours	Collapse	267
Clamp . .	26 „	5 „	Recovered	Very well in 1881; husband died	268
Clamp . .	17 „	5 „	Recovered	Girl born 1869. Well in 1872	269
Clamp . .	20 „	4 „	Recovered	Well and single in 1872. No report since	270
Clamp . .	13 „	4 „	Recovered	In good health, 1874. Gone to South America	271
Clamp . .	31 „	5 „	Recovered	Died 9 years after operation	272
Clamp . .	50 „	4 „	Recovered	Well and single in 1872. Died two or three years ago—old age	273
Clamp . .	9 „	5 „	Recovered	No report	274
Clamp . .	15 „	4 „	Recovered	Very well in 1872. Girls born 1869 and 1870—labours natural	275
Clamp . .	28 „	5 „	Recovered	Very well in 1872. Girl born 1870—labour easier than previous ones	276
Clamp . .	12 „	4 „	Recovered	Well in 1872. No report since	277
Clamp . .	26 „	5 „	Died, 3rd day	Septicæmia	278
Clamp . .	17 „	5 „	Recovered	Well and single in 1881	279
Clamp . .	15 „	4 „	Recovered	Very well in 1872. Boys born 1869 and 1871—labours natural	280
Clamp . .	31 „	5 „	Recovered	Died in 1879	281
Clamp . .	26 „	8 „	Recovered	Married 1874—two children. Well in 1881	282
Clamp . .	19 „	5 „	Recovered	Died, October 1873, of phthisis	283
Ligature . .	9 „	4 „	Died, 42 hours	Septicæmia	284
Cautery . .	56 „	4 „	Recovered	Well in 1881	285
Clamp . .	15 „	4 „	Recovered	Very well in 1881; no child since operation	286
Ligatures—both ovaries removed	23 „	5 „	Died, 23 hours	Shock	287
Clamp . .	33 „	6 „	Died, 30 hours	Exhaustion	288

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
289	Dr. West	1868 Nov.	31	Married	Parietal and omental
290	Hospital	„ Nov.	25	Single	None
291	Mr. Oldham, Brighton	„ Nov.	39	Married	Parietal and omental
292	Mr. Keele, Southampton	„ Nov.	43	Single	None
293	Dr. Ransom, Nottingham	„ Nov.	42	Married	None
294	Dr. Davies, Holywell	„ Nov.	41	Married	None
295	Hospital	„ Dec.	43	Single	Parietal
296	Hospital	„ Dec.	46	Married	Parietal
297	Dr. A. Farre	„ Dec.	22	Single	None
298	Dr. Attenburrow, Jersey	„ Dec.	46	Single	Parietal
299	Hospital	1869 Jan.	25	Single	None
300	Sir T. Watson, Bart.	„ Jan.	28	Single	Parietal and omental
301	Hospital	„ Jan.	49	Married	Parietal. Ruptured cyst
302	Hospital	„ Feb.	41	Married	Parietal
303	Mr. Ewen, Wisbeach	„ Feb.	25	Single	None
304	Dr. Jackson, Oxford	„ Feb.	49	Married	Parietal
305	Dr. Gream	„ Feb.	55	Single	Parietal and pelvic
306	Hospital	„ Feb.	29	Married	Parietal, omental, and intestinal
307	Hospital	„ Feb.	48	Widow	None
308	Hospital	„ Feb.	49	Married	Parietal and pelvic
309	Hospital	„ March	40	Married	Parietal
310	Hospital	„ March	59	Married	None. Burst cyst
311	Dr. Leadam	„ April	38	Widow	Omental
312	Hospital	„ April	54	Single	Parietal and omental
313	Hospital	„ April	35	Single	Parietal and mesenteric
314	Dr. Oldham	„ May	25	Single	None
315	Mr. Squire	„ May	20	Single	None. Burst cyst
316	Mr. Stevens, Christchurch	„ May	36	Single	Parietal and omental
317	Dr. Livy, Bolton	„ May	30	Single	None
318	Dr. Ridley, Canada	„ May	38	Married	None
319	Hospital	„ May	22	Single	None
320	Dr. Braxton Hicks	„ May	39	Married	Omental and pelvic
321	Sir W. Jenner, Bart.	„ June	27	Married	None
322	Hospital	„ June	24	Married	Parietal and pelvic
323	Dr. Nethe, Neuhaidensleben	„ June	42	Married	Intestinal
324	Dr. Fitzpatrick	„ June	30	Single	Omental. Burst cyst
325	Dr. Quain	„ June	50	Single	Parietal and pelvic. Burst cyst
326	Sir G. Burrows	„ June	47	Married	Omental and intestinal

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp and ligatures — both ovaries removed	58 pounds	6 inches	Died, 29 hours	Exhaustion	289
Clamp . .	22 „	4 „	Died, 6th day	Peritonitis	290
Clamp . .	33 „	6 „	Died, 45 hours	Collapse	291
Clamp . .	36 „	5 „	Died, 34 hours	Exhaustion	292
Ligatures .	30 „	4 „	Died, 40 hours	Collapse	293
Clamp . .	13 „	4 „	Recovered	Very well in 1881	294
Clamp . .	23 „	8 „	Recovered	Well in 1872. No report since	295
Ligature . .	7 „	5 „	Died, 56 hours	Peritonitis	296
Clamp . .	18 „	4 „	Died, 57 hours	Pneumonic congestion and embolism	297
Clamp . .	22 „	6 „	Died, 54 hours	Peritonitis	298
Cautery . .	23 „	5 „	Recovered	Died in 1872	299
Clamp and ligatures	28 „	7 „	Recovered	Well in 1872. No report since	300
Pins and ligature	27 „	6 „	Recovered	Died Oct. 1869 of some other disease	301
Clamp . .	49 „	6 „	Recovered	Health excellent in 1881	302
Clamp . .	12 „	4 „	Recovered	Very well in 1872—still single	303
Clamp . .	21 „	7 „	Recovered	Well in 1881	304
Clamp and ligatures	22 „	7 „	Died, 26 hours	Cardiac embolism	305
Ligature . .	39 „	7 „	Died, 4th day	Peritonitis	306
Clamp . .	41 „	4 „	Recovered	No report	307
Clamp and ligature. Both ovaries	19 „	5 „	Recovered	No report	308
Pins and ligature	36 „	9 „	Died, 50 hours	Coma from disease of heart	309
Clamp . .	11 „	6 „	Recovered	No report	310
Clamp . .	13 „	5 „	Recovered	Very well in 1881—husband dead	311
Clamp . .	12 „	5 „	Died, 5th day	Intestinal obstruction	312
Clamp . .	13 „	5 „	Died, 7th day	Peritonitis	313
Clamp . .	18 „	4 „	Recovered	Well and single in 1881	314
Clamp . .	13 „	5 „	Recovered	Married 1878, one child 1880. Well in 1881	315
Clamp . .	40 „	5 „	Died, 4th day	Peritonitis	316
Clamp . .	9 „	4 „	Died, 5th day	Peritonitis	317
Cautery . .	13 „	4 „	Recovered	Recovered second operation July 1876. Well in 1881	318
Clamp and ligature. Both ovaries	11 „	4 „	Recovered	Well in 1872. Stout and florid. No report since	319
Clamp and ligature. Both ovaries	20 „	6 „	Recovered	Died April 1871. Cardiac dropsy	320
Clamp . .	19 „	5 „	Recovered	Three boys—1873, 1874, 1876. Well in 1881	321
Ligatures. Both ovaries	22 „	8 „	Died, 28 hours	Collapse	322
Clamp . .	26 „	6 „	Recovered	Health very good in 1881	323
Clamp . .	13 „	4 „	Recovered	Died of pleurisy, Dec. 1869	324
Clamp . .	9 „	5 „	Died, 17 hours	Peritonitis	325
Clamp . .	26 „	6 „	Recovered	Died in 1878	326

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
327	Dr. Greenhalgh	1869 June	48	Married	Omental & parietal. Burst cyst
328	Hospital	,, June	41	Married	None
329	Hospital	,, June	27	Married	Parietal and omental
330	Mr. Bateman	,, Aug.	36	Married	Omental. Burst cyst. Pregnancy
331	Mr. Corner, Poplar	,, Aug.	30	Single	Parietal, omental and intestinal
332	Mr. Symonds, Oxford	,, Aug.	54	Single	None
333	Mr. Clarke, Huddersfield	,, Sept.	23	Single	None
334	Hospital	,, Oct.	52	Single	None
335	Dr. Gervis	,, Oct.	37	Single	None
336	Hospital	,, Oct.	43	Married	None. Burst cyst
337	Hospital	,, Nov.	26	Single	Parietal and omental
338	Dr. Case, Fareham	,, Nov.	18	Single	None
339	Dr. Rayner, Stockport	,, Nov.	31	Married	None
340	Hospital	,, Nov.	46	Married	Parietal and intestinal
341	Hospital	,, Nov.	29	Single	Intestinal
342	Hospital	,, Dec.	35	Single	None
343	Dr. Ramskill	,, Dec.	54	Married	Omental
344	Hospital	,, Dec.	51	Married	Omental and intestinal
345	Mr. Crompton, Birmingham	1870 Jan.	39	Single	Pelvic
346	Dr. Symonds, Clifton	,, Jan.	48	Single	Parietal
347	Hospital	,, Jan.	42	Married	Parietal and omental
348	Dr. West	,, Jan.	34	Single	To cæcum
349	Hospital	,, Jan.	24	Single	Omental and parietal
350	Hospital	,, Feb.	47	Widow	Parietal
351	Sir J. Alderson	,, Feb.	40	Single	None
352	Mr. Cockcroft, Darlington	,, Feb.	28	Married	None
353	Dr. Priestley	,, Feb.	20	Single	None
354	Hospital	,, March	22	Single	Omental
355	Sir W. Jenner, Bart.	,, March	63	Widow	Omental
356	Hospital	,, March	48	Married	None
357	Hospital	,, April	37	Married	None
358	Mr. Beckingscale, Newport	,, April	53	Married	Omental and intestinal
359	Dr. Evans, Birmingham	,, April	61	Single	Omental, intestinal, and parietal
360	Hospital	,, April	32	Married	Omental
361	Mr. Tweddell, Houghton-le-Spring	,, April	46	Married	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	23 pounds	6 inches	Died, 3rd day	Peritonitis	327
Ligature . .	18 ,,	4 ,,	Died, 3rd day	Obstructed intestine	328
Clamp . .	23 ,,	6 ,,	Recovered	Child (boy) born Feb. 1870	329
Clamp . .	37 ,,	7 ,,	Recovered	Child born, Feb. 1870. Died of cancer of uterus, March 1871	330
Clamp . .	22 ,,	6 ,,	Recovered	Died, Dec. 1869, of diffuse carcinoma	331
Clamp . .	22 ,,	5 ,,	Recovered	Well in 1881	332
Clamp . .	6 ,,	4 ,,	Recovered	Married 1870. Boy born 1871—labour easy. No report since	333
Clamp . .	17 ,,	4 ,,	Recovered	No report	334
Clamp . .	6 ,,	4 ,,	Recovered	Well in 1881. Still single	335
Clamp and ligature	20 ,,	6 ,,	Recovered	Died June 1872. Re-growth of ovarian tumour. Amyloid kidneys	336
Clamp . .	21 ,,	4 ,,	Recovered	Well and single in 1881	337
Clamp . .	16 ,,	3 ,,	Recovered	Well and single in 1872	338
Clamp . .	21 ,,	4 ,,	Recovered	Health fair in 1881—no child since operation	339
Clamp . .	24 ,,	6 ,,	Died, 26 hours	Collapse	340
Ligature . .	19 ,,	4 ,,	Recovered	Well and single in 1872. No report since	341
Clamp and ligature	14 ,,	4 ,,	Recovered	Health excellent in 1872—still single	342
Clamp . .	16 ,,	4 ,,	Recovered	Very well in 1881	343
Cautery and ligature .	13 ,,	6 ,,	Recovered	Died—return of disease 1871	344
Clamp and ligature	13 ,,	5 ,,	Recovered	Married Oct. 1870—child born Oct. 1871—well in 1881	345
Clamp . .	24 ,,	5 ,,	Recovered	Well and single in 1881	346
Clamp . .	23 ,,	5 ,,	Recovered	Died 1873	347
Clamp and ligature. Both ovaries	12 ,,	3 ,,	Recovered	Well and single in 1881	348
Clamp . .	33 ,,	4 ,,	Died, 4th day	Peritonitis	349
Clamp and ligature	23 ,,	5 ,,	Died, 39 hours	Peritonitis	350
Clamp . .	16 ,,	4 ,,	Recovered	Health very good, married June 1871. Well in 1881	351
Clamp . .	28 ,,	4 ,,	Recovered	Health excellent in 1872. No report since	352
Clamp and ligature. Both ovaries	18 ,,	4 ,,	Died, 5th day	Peritonitis	353
Clamp . .	33 ,,	8 ,,	Recovered	Married 1876—children, girls. Died of consumption 1880	354
Ligature . .	42 ,,	6 ,,	Died, 6th day	Septicæmia	355
Clamp . .	11 ,,	4 ,,	Died, 4th day	Septicæmia	356
Clamp . .	17 ,,	6 ,,	Recovered	Health very good in 1872—alive in 1881	357
Clamp and ligature	35 ,,	6 ,,	Died, 18th day	Exhaustion	358
Clamp . .	33 ,,	6 ,,	Recovered	Well and single in 1881	359
Clamp . .	29 ,,	6 ,,	Recovered	Health good in 1881, has had several miscarriages both before and since operation, and two boys 1874 and 1876	360
Clamp . .	22 ,,	5 ,,	Recovered	Well in 1881	361

No.	Medical Attendant	Date	Age	Condition	Adhesions
362	Hospital	1870 April	22	Married	Omental
363	Sir W. Gull, Bart.	„ May	53	Widow	None
364	Mr. Barkway, Bungay	„ May	42	Married	Parietal and omental
365	Hospital	„ May	45	Married	Parietal
366	Hospital	„ May	27	Single	Parietal and omental
367	Dr. Kinnear, Malmesbury	„ May	29	Single	None
368	Dr. Miller, Blackheath	„ May	25	Married	Parietal
369	Hospital	„ May	47	Married	Parietal and omental
370	Hospital	„ June	33	Married	None
371	Dr. Welch, Southampton	„ June	34	Married	None
372	Dr. Collyer, Enfield	„ June	28	Married	None
373	Dr. Unna, Hamburgh	„ June	44	Married	Omental and pelvic
374	Hospital	„ June	40	Single	None
375	Hospital	„ June	32	Married	Parietal
376	Hospital	„ July	32	Married	Parietal and omental
377	Mr. Pyne, Royston	„ July	42	Married	None
378	Hospital	„ July	38	Single	Omental
379	Dr. Cole, Bath	„ July	27	Single	None
380	Dr. West	„ Aug.	18	Single	Omental
381	Dr. Swain, Birmingham	„ Aug.	29	Single	None
382	Hospital	„ Aug.	31	Married	Omental
383	Mr. Belcher, Burton	„ Aug.	26	Single	None
384	Mr. Godson	„ Aug.	43	Widow	Parietal
385	Hospital	„ Oct.	24	Single	Omental
386	Mr. Roberts, Portmadoc	„ Oct.	53	Married	None
387	Dr. Orsborne, Bittern	„ Oct.	59	Widow	Parietal
388	Dr. Smith, Weymouth	„ Oct.	52	Single	None
389	Hospital	„ Oct.	36	Married	Parietal
390	Mr. Gibson, Norwich	„ Oct.	63	Single	Parietal
391	Hospital	„ Oct.	53	Married	None. Burst cyst
392	Hospital	„ Oct.	42	Married	Parietal
393	Hospital	„ Nov.	30	Single	None
394	Dr. Prince	„ Nov.	50	Single	Parietal
395	Dr. Smith, Weymouth	„ Nov.	51	Widow	None
396	Hospital	„ Nov.	23	Single	Parietal and omental
397	Mr. Morris, Edmonton	„ Nov.	50	Married	None. Burst cyst

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Ligature . .	6 pounds	5 inches	Recovered	No report	362
Clamp . .	21 „	5 „	Recovered	Recovered after second ovariotomy 1878. Well in 1881	363
Clamp . .	18 „	5 „	Recovered	Health good in 1881	364
Clamp . .	56 „	6 „	Died, 3rd day	Hyperpyrexia	365
Ligature . .	11 „	5 „	Recovered	Well and single in 1872. Second operation in 1875. Married 1876—well in 1881	366
Clamp . .	22 „	5 „	Recovered	Well and single in 1881	367
Clamp . .	17 „	5 „	Recovered	Well in 1872. No report since	368
Clamp . .	27 „	6 „	Recovered	Health very good in 1872	369
Clamp . .	15 „	5 „	Died, 32 hours	Pneumonic congestion	370
Clamp . .	28 „	5 „	Recovered	Health good in 1881; no child since operation	371
Clamp . .	30 „	7 „	Recovered	Girl born July 1871. Very well in 1872. No report since	372
Ligature . .	6 „	7 „	Recovered	Died in 1881—asthma	373
Clamp . .	12 „	6 „	Recovered	Well and single in 1872. No report since	374
Clamp . .	7 „	6 „	Recovered	Boy born, July 1873. No report since	375
Clamp . .	22 „	6 „	Recovered	Health good in 1872, husband dead. Remarried—became pregnant. Not heard of since	376
Clamp . .	28 „	5 „	Recovered	Health good in 1872. No report since	377
Clamp and ligature. Both ovaries	16 „	5 „	Died, 4th day	Peritonitis	378
Clamp . .	10 „	5 „	Recovered	Very well and single in 1881	379
Clamp . .	16 „	5 „	Recovered	Well and single in 1881	380
Clamp . .	21 „	4 „	Recovered	Very well and single in 1872. No report since	381
Clamp . .	21 „	5 „	Recovered	Health good in 1872, husband dead. No report since	382
Clamp . .	25 „	5 „	Recovered	Married 1872—boy born 1873. Well in 1874	383
Clamp . .	29 „	5 „	Recovered	Health good in 1872. No report since	384
Clamp . .	26 „	5 „	Recovered	Since married — child in 1875; in 1877 tumour of breast. No report since	385
Clamp . .	13 „	5 „	Recovered	Died in 1877—kidney disease	386
Clamp . .	11 „	5 „	Recovered	Health very good in 1872. No report since	387
Clamp and ligature. Both ovaries	24 „	5 „	Recovered	Well and single in 1881	388
Clamp . .	11 „	5 „	Recovered	Twins, girl and boy, born July 1872; girl in 1874. Well in 1881	389
Clamp . .	26 „	5 „	Recovered	Well and single in 1881	390
Clamp . .	44 „	5 „	Died, 35 hours	Exhaustion	391
Clamp . .	47 „	5 „	Recovered	Health excellent in 1881	392
Clamp . .	7 „	5 „	Recovered	No report	393
Clamp . .	. . .	5 „	Recovered	Died of bronchitis, May 1871	394
Clamp . .	23 „	5 „	Recovered	Health excellent in 1881	395
Clamp . .	7 „	5 „	Recovered	Married 1877—girl 1878, boy 1880. Well in 1881	396
Ligature . .	. . .	5 „	Recovered	At end of 1871 cicatrix gave way, colloid fluid escaped, and continued till she died early in 1872	397

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
398	Hospital	1870 Dec.	65	Married	Parietal, omental, and intestinal
399	Mr. Goddard	„ Dec.	29	Married	None. Pregnant
400	Dr. Thetford	„ Dec.	34	Married	Parietal. Burst cyst
401	Mr. Yate, Godalming	1871 Jan.	52	Married	Parietal
402	Mr. Aikin	„ Jan.	37	Married	Parietal
403	Hospital	„ Jan.	38	Married	Omental and mesenteric
404	Dr. Druitt	„ Jan.	63	Single	None
405	Dr. Webb	„ Jan.	58	Married	Parietal. Cyst suppurating
406	Dr. Sieveking	„ Feb.	50	Single	None. Burst cyst
407	Hospital	„ Feb.	25	Married	Parietal
408	Dr. Chepmall	„ Feb.	27	Single	Parietal
409	Dr. Webb	„ Feb.	21	Single	None
410	Hospital	„ March	32	Married	Omental
411	Mr. Weekes, Hurstpierpoint	„ March	25	Single	Omental
412	Hospital	„ March	30	Single	Parietal
413	Hospital	„ March	36	Single	Parietal
414	Hospital	„ April	43	Single	Parietal
415	Mr. Butler, Guildford	„ April	53	Single	Omental
416	Mr. Scrase, Lewes	„ April	45	Married	Parietal. Burst cyst
417	Hospital	„ April	38	Married	Parietal and omental
418	Hospital	„ April	52	Single	None
419	Dr. Ross	„ May	38	Married	Omental and intestinal. Pregnancy
420	Hospital	„ May	54	Married	Parietal and omental.
421	Dr. Mayer, Berlin	„ May	29	Married	Parietal
422	Hospital	„ May	51	Single	Parietal and omental.
423	Hospital	„ May	54	Single	Parietal
424	Dr. Greenhalgh	„ May	38	Married	None
425	Mr. Fouracre, Hornsey	„ June	19	Single	None
426	Hospital	„ June	29	Married	Omental
427	Dr. Schetelig, Hamburgh	„ June	50	Married	Parietal and mesenteric
428	Dr. Jackson, Southsea	„ July	50	Single	None
429	Hospital	„ July	29	Married	Parietal and omental.
430	Hospital	„ July	35	Married	None
431	Dr. Ronayne, Youghal	„ July	30	Single	None
432	Hospital	„ July	68	Married	Parietal
433	Hospital	„ July	50	Married	None
434	Professor Winkel, Rostock	„ Aug.	37	Married	None
435	Dr. Bell	„ Aug.	42	Married	Parietal

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	66 pounds	8 inches	Recovered	Very well in 1872. No report since	398
Clamp . .	15 „	5 „	Recovered	Child born seven months after operation. Four children since operation 1871–73–76–78. Very well in 1881	399
Clamp . .	28 „	5 „	Recovered	One child in 1876. Well in 1881	400
Clamp . .	17 „	5 „	Recovered	Health very fair in 1872. No report since	401
Clamp and ligature	15 „	5 „	Recovered	Girl born 1873. Well in 1881	402
Clamp and ligature	6 „	5 „	Recovered	Health very fair in 1881. Asthma of long standing	403
Ligature . .	20 „	5 „	Recovered	Died 1880 of bronchitis	404
Clamp . .	19 „	5 „	Recovered	Very well in 1881	405
Clamp . .	21 „	5 „	Recovered	Well and single in 1881	406
Clamp . .	35 „	5 „	Recovered	Children born in 1872–77–79. Well in 1881	407
Clamp . .	16 „	5 „	Recovered	Well in 1881	408
Clamp . .	. . .	4 „	Recovered	Married Sept. 1875—children 1877–78–81; last born Sept. 24, 1881. Well Nov. 1881	409
Clamp . .	35 „	5 „	Recovered	Small hernia near cicatrix. Girl born Jan. 1872—boy in July 1874. Well in 1881	410
Clamp . .	13 „	5 „	Recovered	Well and single in 1881	411
Clamp . .	23 „	5 „	Recovered	Died April 1872 of acute rheumatism and endocarditis	412
Clamp . .	6 „	4 „	Died, 5th day	Septicæmia	413
Cautery . .	39 „	5 „	Recovered	Died in 1872 of bronchitis	414
Clamp . .	7 „	4 „	Died, 3rd day	Exhaustion	415
Ligature . .	34 „	6 „	Recovered	Died April 1873	416
Clamp . .	24 „	5 „	Recovered	Boy in 1874. Health good in 1881	417
Ligature . .	7 „	4 „	Recovered	Alive in 1881, phthisical	418
Ligature . .	32 „	5 „	Recovered	Child born Dec. 1871, another 1877. Alive but ill in 1881	419
Clamp . .	22 „	5 „	Died, 13th day	Pleuritic effusion	420
Clamp and ligature. Both ovaries	19 „	5 „	Recovered	Well in 1872. No report since	421
Clamp . .	19 „	4 „	Recovered	Well and single in 1881	422
Clamp . .	42 „	6 „	Died, 5th day	Septic peritonitis	423
Clamp . .	33 „	6 „	Died, 32 hours	Exhaustion	424
Clamp . .	19 „	6 „	Recovered	Health very good in 1881. Still single	425
Clamp . .	18 „	7 „	Died	Went home, but died 25 days after	426
Ligature. Both ovaries	. . .	9 „	Died	Peritonitis	427
Ligature . .	. . .	5 „	Recovered	Well and single in 1881	428
Clamp . .	30 „	6 „	Recovered	Well in 1872. No report since	429
Clamp . .	17 „	5 „	Recovered	Quite well in 1881	430
Clamp . .	22 „	4 „	Recovered	Well in 1881	431
Clamp . .	25 „	6 „	Recovered	Died of heart disease 1873	432
Clamp and ligature. Both ovaries	21 „	5 „	Recovered	Died Dec. 1871 of malignant disease	433
Clamp . .	12 „	5 „	Recovered	Well in 1881. Husband dead	434
Clamp . .	. . .	5 „	Recovered	Boy born 1873. Husband dead. Very well in 1881	435

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
436	Mr. Barlow	1871 Aug.	41	Married	Omental and mesenteric
437	Dr. Boddaert, Ghent	„ Aug.	52	Married	Parietal and pelvic
438	Mr. Ticehurst, Hastings	„ Aug.	22	Single	None
439	Hospital	„ Aug.	32	Single	Parietal and omental. Burst cyst
440	Professor Schwartz, Göttingen	„ Aug.	23	Single	None
441	Hospital	„ Oct.	41	Married	None
442	Mr. Baker, Birmingham	„ Oct.	32	Single	None. Burst cyst
443	Hospital	„ Oct.	42	Single	None
444	Dr. Farre	„ Oct.	50	Married	None
445	Dr. Budd, Clifton	„ Nov.	30	Single	None
446	Dr. Pirrie, Belfast	„ Nov.	40	Married	None
447	Mr. Marriott, Leicester	„ Nov.	42	Married	None
448	Hospital	„ Nov.	27	Single	None
449	Dr. Lyon, Clifton	„ Nov.	29	Single	None
450	Mr. Roughton, Kettering	„ Nov.	42	Married	None
451	Mr Riggall.	„ Nov.	56	Married	Parietal. Cyst suppurating
452	Hospital	„ Dec.	27	Married	None
453	Hospital	„ Dec.	34	Single	None
454	Hospital	„ Dec.	40	Married	Parietal
455	Hospital	„ Dec.	21	Single	None
456	Hospital	„ Dec.	28	Single	None
457	Sir J. Alderson	„ Dec.	60	Married	Intestinal and mesenteric
458	Dr. Turner, Minchinhampton	1872 Jan.	27	Married	Parietal
459	Hospital	„ Jan.	17	Single	Parietal and omental.
460	Mr. Bell, Rochester	„ Jan.	60	Single	Parietal and intestinal
461	Mr. T. H. Hill	„ Jan.	55	Married	Parietal and pelvic
462	Dr. Smith	„ Jan.	53	Married	Parietal, omental, and intestinal
463	Mr. Turner, Bermondsey	„ Jan.	46	Married	None. Burst cyst
464	Dr. Stewart, Whitby	„ Jan.	48	Married	Omental and pelvic
465	Hospital	„ Feb.	22	Married	None
466	Mr. Pollard, Torquay	„ Feb.	46	Married	Parietal, omental, and intestinal
467	Dr. Powne, Swindon	„ Feb.	57	Married	Parietal
468	Hospital	„ Feb.	23	Married	None. Burst cyst
469	Hospital	„ Feb.	41	Single	None
470	Hospital	„ Feb.	44	Single	None
471	Hospital	„ Feb.	48	Married	Parietal and omental.
472	Hospital	„ Feb.	44	Married	None
473	Hospital	„ March	51	Single	Parietal and omental.
474	Hospital	„ March	40	Married	Omental. Burst cyst.
475	Hospital	„ March	32	Single	Omental
476	Hospital	„ March	29	Married	Omental. Pregnancy
477	Hospital	„ March	50	Married	None. Burst cyst

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Ligature . .	15 pounds	5 inches	Recovered	Well in 1872. No report since	436
Clamp . .	33 ,,	6 ,,	Recovered	Well in 1881	437
Clamp . .	8 ,,	4 ,,	Recovered	Well and single in 1881	438
Ligature	6 ,,	Died, 5 hours	Collapse		439
Clamp . .	13 ,,	4 ,,	Recovered	Health very good in 1872. Still single	440
Ligature. Both ovaries	37 ,,	6 ,,	Died, 3rd day	Pulmonary embolism	441
Clamp . .	11 ,,	5 ,,	Recovered	Well and single in 1881	442
Clamp . .	23 ,,	4 ,,	Recovered	Well in 1881	443
Clamp . .	28 ,,	4 ,,	Died, 7th day	Septicæmia	444
Clamp . .	8 ,,	5 ,,	Recovered	Well and single in 1881	445
Ligature . .	24 ,,	5 ,,	Recovered	Died in 1873	446
Clamp . .	23 ,,	4 ,,	Recovered	Well in 1881	447
Clamp . .	8 ,,	4 ,,	Died, 5th day	Septicæmia	448
Ligature . .	18 ,,	4 ,,	Died, 5th day	Hyperpyrexia and pericarditis	449
Clamp . .	15 ,,	5 ,,	Died, 23 hours	Exhaustion	450
Clamp . .	49 ,,	8 ,,	Died, 26 hours	Septicæmia	451
Clamp . .	35 ,,	6 ,,	Recovered	Three children, 1872–73–75. Married second time 1880. Well in 1881	452
Clamp . .	11 ,,	5 ,,	Died, 4th day	Septicæmia	453
Clamp . .	51 ,,	6 ,,	Recovered	Remains well in 1881	454
Clamp . .	16 ,,	5 ,,	Recovered	Married 1878. Well in 1881	455
Pin and ligature	10 ,,	5 ,,	Recovered	Well in 1872. No report since	456
Clamp . .	15 ,,	6 ,,	Recovered	Well in 1881	457
Clamp . .	22 ,,	6 ,,	Recovered	Remains well 1872. No report in 1881	458
Clamp . .	16 ,,	5 ,,	Recovered	No report since 1872	459
Clamp . .	33 ,,	6 ,,	Recovered	Died in March	460
Clamp . .	10 ,,	4 ,,	Recovered	Remains well 1872. No report since	461
Clamp . .	18 ,,	5 ,,	Recovered	No report since 1872	462
Clamp . .	18 ,,	4 ,,	Recovered	Remains well in 1881	463
Clamp . . .	41 ,,	6 ,,	Died, 3rd day	Exhaustion	464
Clamp . .	24 ,,	4 ,,	Recovered	No report since 1872	465
Clamp . .	15 ,,	4 ,,	Recovered	Died in 1878	466
Clamp . .	14 ,,	5 ,,	Recovered	Remains well 1872. No report since	467
Clamp . .	36 ,,	5 ,,	Recovered	Four children since operation—girls 1873–76, boys 1879–81. Remains well in 1881	468
Clamp . .	15 ,,	4 ,,	Recovered	Remains well in 1881	469
Clamp . .	16 ,,	4 ,,	Recovered	Died 1879 of pneumonia	470
Clamp . .	33 ,,	5 ,,	Recovered	Remains well in 1881	471
Clamp . .	28 ,,	5 ,,	Recovered	Remains well in 1881	472
Clamp . .	19 ,,	5 ,,	Died, 4th day	Peritonitis	473
Ligature . .	16 ,,	5 ,,	Died, 3rd day	Peritonitis	474
Ligature . .	30 ,,	5 ,,	Died, 7th day	Peritonitis	475
Ligature . .	10 ,,	5 ,,	Recovered	Child (girl) born two months after operation at 6th month of pregnancy; lived 21 hours; girl in 1873 at full time, still alive. Mother well in 1881	476
Clamp and ligature	17 ,,	7 ,,	Died, 4th day	Pneumonia	477

No.	Medical Attendant	Date of Operation.	Age	Condition	Adhesions
478	Hospital	1872 April	26	Single	Omental
479	Hospital	„ April	31	Married	Parietal and omental
480	Hospital	„ April	23	Single	Parietal
481	Professor Bardeleben	„ April	24	Single	None
482	Mr. Lys, Blandford	„ April	27	Married	Parietal
483	Hospital	„ April	48	Married	Parietal
484	Hospital	„ April	60	Married	Parietal and omental
485	Dr. Day	„ April	43	Married	None
486	Mr. Earle, Brentwood	„ April	48	Married	None
487	Hospital	„ April	57	Married	Parietal
488	Sir W. Gull, Bart.	„ May	53	Single	None
489	Sir W. Gull, Bart.	„ May	29	Single	Omental
490	Mr. Moreton, Tarvin	„ May	51	Married	Parietal
491	Hospital	„ May	42	Single	None
492	Hospital	„ May	53	Married	Parietal
493	Mr. Mason	„ June	39	Married	Parietal
494	Hospital	„ June	36	Married	Burst cyst
495	Dr. Hickson, Scarboro'	„ June	22	Single	None
496	Hospital	„ June	45	Married	Parietal and omental
497	Mr. Bracey, Birmingham	„ June	48	Married	Parietal and omental
498	Mr. Whipple, Plymouth	„ June	21	Single	None
499	Hospital	„ June	37	Married	Parietal and omental
500	Hospital	„ June	54	Married	Parietal and omental
501	Hospital	„ July	21	Single	None
502	Dr. Busch, Ramsbeck	„ July	51	Married	Parietal
503	Hospital	„ July	45	Married	None
504	Dr. Ormerod, Brighton	„ July	43	Single	None
505	Hospital	„ July	50	Single	Pelvic
506	Dr. Kesteven	„ July	56	Married	Pelvic
507	Hospital	„ Aug.	32	Married	Omental. Pregnant
508	Dr. Prior, Bedford	„ Aug.	31	Married	Omental and intestinal
509	Mr. W. Stewart	„ Aug.	43	Married	Parietal
510	Mr. Hall, Sheffield	„ Aug.	42	Married	Parietal and omental
511	Dr. Williamson	„ Aug.	54	Married	Pelvic, omental, and parietal
512	Dr. Fripp, Clifton	„ Aug.	46	Married	None
513	Dr. Pagenkopff, Moscow	„ Aug.	27	Married	Parietal
514	Dr. Docker, Boulogne	„ Aug.	20	Single	None
515	Mr. Mercer, Deal	„ Oct.	31	Single	None
516	Dr. T. K. Chambers	„ Oct.	37	Married	Uterine
517	Dr. Churchill, Dublin	„ Oct.	27	Single	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	20 pounds	6 inches	Recovered	Remains well and single in 1881	478
Clamp . .	24 „	4 „	Recovered	Died, July 1872—obstructed intestine	479
Clamp and ligature	25 „	7 „	Recovered	No report since 1872	480
Clamp and ligature	12 „	6 „	Recovered	Married 1874—three children—boys 1875–77; girl 1879. Well in 1881	481
Clamp . .	27 „	5 „	Recovered	Child in 1877. Remains well in 1881	482
Clamp		5 „	Recovered	Remains well in 1881	483
Clamp . .	26 „	7 „	Recovered	Remains well in 1881	484
Clamp . .	8 „	5 „	Recovered	Remains well in 1881	485
Clamp . .	14 „	4 „	Recovered	Remains well in 1881. Husband dead	486
Clamp		5 „	Recovered	Remains well in 1881	487
Clamp . .	22 „	4 „	Recovered	Died 1880	488
Clamp . .	26 „	5 „	Recovered	Remains well and single in 1881	489
Clamp . .	28 „	4 „	Recovered	Remains well in 1881	490
Clamp		6 „	Recovered	Remains well in 1881	491
Clamp		5 „	Recovered	No report since 1872	492
Clamp . .	34 „	5 „	Recovered	Well in 1876. Not seen since	493
Clamp. Both ovaries	21 „	4 „	Recovered	Died in 1876 of malignant disease of abdomen	494
Pin and ligature. Both ovaries	18 „	5 „	Recovered	Remains well in 1881	495
Ligature . .	25 „	6 „	Recovered	Remains well in 1881	496
Clamp . .	26 „	5 „	Recovered	Remains well in 1881	497
Clamp . .	6 „	4 „	Recovered	Married – one child. Remains well in 1881	498
Clamp . .	16 „	5 „	Recovered	One child since operation. Remains well in 1881	499
Ligature . .	24 „	5 „	Recovered	Returned to Suffolk. Died a month after with cerebral symptoms	500
Clamp and ligature	27 „	5 „	Recovered	Married 1877—girl born 1878. Well in 1881	501
Clamp and ligature	21 „	6 „	Recovered	Well in 1876. No report since	502
Clamp . .	8 „	5 „	Recovered	Well in July 1873. No report since	503
Clamp . .	13 „	4 „	Recovered	Well in 1876. No report since	504
Ligature		7 „	Died, 7th day	Pyæmic fever	505
Clamp . .	12 „	6 „	Died, 40 hours	Peritonitis	506
Ligature . .	26 „	6 „	Recovered	Had 7 months' child day after operation. Boys born Dec. 1873 and March 1876. No report since	507
Clamp . .	18 „	4 „	Recovered	Well in 1881	508
Clamp . .	8 „	5 „	Recovered	No report	509
Ligature . .	21 „	5 „	Recovered	Well in 1881	510
Ligature . .	52 „	5 „	Died, 6th day	Peritonitis	511
Ligature . .	6 „	5 „	Recovered	Well in 1881	512
Clamp and ligature. Both ovaries	37 „	5 „	Recovered	Well in 1876. No report since	513
Clamp . .	24 „	5 „	Recovered	Well in 1881	514
Clamp . .	21 „	5 „	Died, 5th day	Septicæmia	515
Ligature . .	13 „	5 „	Died, 42 hours	Septicæmia	516
Clamp . .	10 „	4 „	Recovered	Well in 1881	517

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
518	Dr. Thursfield, Leamington	1873 Oct.	60	Single	None
519	Dr. C. E. Roberts, Southgate	„ Oct.	39	Single	None. Burst cyst
520	Dr. Ormerod, Brighton	„ Oct	67	Married	Parietal and omental
521	Hospital	„ Oct.	28	Married	Omental and parietal
522	Dr. Roche, Chelmsford	„ Nov.	64	Married	Parietal and omental
523	Dr. Wane	„ Nov.	35	Married	Omental and parietal
524	Mr. Reid, Canterbury	„ Nov.	50	Married	Omental, intestinal, and parietal
525	Hospital	„ Nov.	25	Single	None
526	Hospital	„ Jan.	58	Married	Omental
527	Dr. Sealy, Barbadoes	„ Jan.	42	Married	None
528	Hospital	„ Jan.	37	Married	Parietal
529	Dr. Hawkesley	„ Jan.	49	Married	None
530	Hospital	„ Jan.	22	Single	Omental and parietal
531	Hospital	„ Feb.	56	Married	Omental
532	Hospital	„ Feb.	32	Married	None
533	Mr. Edgar Barker	„ Feb.	44	Married	Intestinal, omental, and parietal
534	Mr. Edgar Barker	„ Feb.	42	Married	None
535	Hospital	„ Feb.	30	Married	Omental
536	Dr Churchill, Dublin	„ Feb.	40	Single	Omental
537	Dr. Oldham	„ Feb.	57	Married	Uterine
538	Hospital	„ Feb.	31	Single	None
539	Mr. Bishop, Tunbridge	„ Feb.	31	Single	Omental and parietal
540	Mr. Crompton, Birmingham	„ March	34	Single	None
541	Hospital	„ March	30	Single	None
542	Dr. Watt Black	„ March	60	Single	Parietal
543	Hospital	„ March	54	Single	None
544	Dr. Sharpe, Woolwich	„ March	38	Married	None
545	Dr. Rutherford, Pulborough	„ April		Married	None
546	Dr. A. Brown, Islington	„ April	33	Single	None
547	Dr. Evans, Hertford	„ April	30	Married	None
548	Hospital	„ April	49	Married	None
549	Hospital	„ April	29	Married	Parietal
550	Hospital	„ April	50	Married	Parietal
551	Hospital	„ April	20	Single	Parietal
552	Mr. Curtis, Alton	„ May	42	Single	None
553	Mr. Ruddock	„ May	17	Single	None
554	Dr. Freund, Breslau	„ May	36	Single	None
555	Hospital	„ May	26	Single	None
556	Mr. Hughes, Bromley	„ May	43	Single	Parietal
557	Dr. Prince	„ May	30	Married	None
558	Dr. Swayne, Clifton	„ June	30	Single	None
559	Mr. Scattergood, Leeds	„ June	41	Married	Parietal
560	Hospital	„ June	30	Married	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	20 pounds	4 inches	Recovered	Well in 1881	518
Pin and ligature	36 „	6 „	Recovered	Died Sept. 1873. Cancer	519
Ligature . .	6 „	5 „	Died, 5th day	Peritonitis	520
Clamp . .	21 „	5 „	Recovered	Had twins in Sept. 1873. No report since	521
Clamp . .	22 „	5 „	Died, 13 hours	Exhaustion	522
Clamp . .	41 „	5 „	Recovered	A child in 1873 ; abortion 1875 ; child 1876. Well in 1881	523
Clamp . .	10 „	5 „	Recovered	Well in Dec. 1876. No report since	524
Clamp . .	25 „	5 „	Died, 3rd day	Obstruction of intestine	525
Clamp . .	11 „	5 „	Died, 4th day	Peritonitis	526
Clamp . .	9 „	5 „	Died, 7th day	Peritonitis	527
Ligature . .	19 „	5 „	Died, 2nd day	Septicæmia	528
Clamp . .	8 „	4 „	Died, 4th day	Uræmia from suppression of urine	529
Clamp . .	28 „	4 „	Recovered	Well a year after. No report since	530
Ligature . .	17 „	5 „	Recovered	Well Dec. 1876. No report since	531
Clamp . .	13 „	4 „	Recovered	Married second time 1880. Well in 1881	532
No pedicle .	8 „	5 „	Recovered	Well Dec. 1876. No return of disease. Died of paraplegia	533
Clamp . .	23 „	4 „	Recovered	Well in 1881	534
No pedicle .	33 „	5 „	Recovered	Died of pleurisy one year after	535
Ligature . .	4 „	4 „	Recovered	Married 1878. Well in 1881	536
Pin and écraseur	22 „	5 „	Recovered	Well in 1881	537
Clamp . .	23 „	5 „	Recovered	Well in 1881	538
Clamp . .	11 „	4 „	Recovered	Recovered after removal of other ovary in 1874. Died 1876, two years after second operation	539
Clamp . .	13 „	4 „	Recovered	Well in 1881	540
Clamp . .	19 „	4 „	Died, 8th day	Septicæmia	541
Clamp . .	23 „	5 „	Recovered	Well in 1881	542
Ligature . .	12 „	5 „	Died, 3rd day	Septicæmia	543
Clamp . .	17 „	4 „	Recovered	Boy born Feb. 1876. Well in 1881	544
Clamp . .	16 „	4 „	Recovered	Died of cancer, 1874	545
Clamp . .	17 „	4 „	Recovered	Well in 1881	546
Clamp . .	16 „	4 „	Recovered	Well in 1881	547
Clamp . .	19 „	4 „	Recovered	Well in 1881	548
Clamp . .	30 „	6 „	Died, 42 hours	Exhaustion	549
Clamp . .	50 „	6 „	Recovered	Well in 1881	550
Clamp . .	20 „	4 „	Recovered	Recovered after removal of second ovary in 1876. Well in 1881	551
Ligature . .	7 „	4 „	Died, 3rd day	Peritonitis	552
Clamp . .	18 „	4 „	Died, 3rd day	Peritonitis	553
Clamp . .	15 „	4 „	Died, 48 hours	Septicæmia	554
Clamp . .	13 „	5 „	Died, 12th day	Septicæmia	555
Clamp . .	14 „	4 „	Recovered	Well in 1881	556
Ligature. Both ovaries	14 „	5 „	Recovered	Died April 1874. Cancer	557
Clamp		4 „	Recovered	Married in 1875. Child born July 1876, another since. Well in 1881	558
Clamp . .	33 „	5 „	Died, 15th day	Cardiac embolism	559
Clamp . .	18 „	5 „	Recovered	No report	560

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
561	Dr. Pagenkopff, Moscow	1873 June	42	Married	Parietal
562	Hospital	„ June	21	Married	Parietal
563	Hospital	„ June	58	Married	None
564	Dr. Gonzalez, Rio de Janeiro	„ June	53	Single	Parietal, intestinal, and pelvic
565	Hospital	„ July	28	Single	None
566	Hospital	„ July	21	Married	Omental
567	Hospital	„ July	51	Single	Parietal
568	Mr. Garraway, Faversham	„ July	32	Married	Parietal and omental
569	Dr. Thomson, Omagh	„ July	34	Married	None
570	Hospital	„ July	20	Married	None
571	Hospital	„ July	51	Married	None
572	Hospital	„ July	37	Single	None
573	Dr. Corner	„ Aug.	20	Single	None
574	Dr. Guinness, Oxford	„ Aug.	29	Married	Parietal and omental
575	Dr. Bell	„ Aug.	52	Married	None
576	Dr. F. E. Image, Bury St. Edmunds	„ Oct.	40	Married	Parietal
577	Hospital	„ Oct.	47	Married	None
578	Dr. Braxton Hicks	„ Oct.	39	Married	Omental
579	Hospital	„ Oct.	58	Married	Omental
580	Dr. Chessall, Horley	„ Oct.	32	Single	Pelvic
581	Hospital	„ Oct.	52	Single	Intestinal
582	Dr. Brodie	„ Oct.	22	Married	Parietal
583	Hospital	„ Oct.	55	Married	Parietal and omental
584	Mr. Marriott, Swaffham	„ Oct.	21	Single	None
585	Mr. Riggall	„ Nov.	47	Married	None
586	Hospital	„ Nov.	35	Married	Omental and intestinal
587	Hospital	„ Nov.	55	Single	None
588	Dr. Hewer	„ Nov,	44	Married	None
589	Hospital	„ Nov.	34	Married	Omental and parietal
590	Dr. Giles, Oxford	„ Dec.	45	Single	None
591	Dr. Swayne, Clifton	„ Dec.	44	Single	Parietal
592	Hospital	„ Dec.	29	Married	Omental
593	Hospital	„ Dec.	24	Single	None
594	Dr. Gage Brown	„ Dec.	41	Single	Parietal
595	Hospital	„ Dec.	43	Married	Parietal and omental
596	Hospital	„ Dec.	46	Married	None
597	Mr. Humby	„ Dec.	56	Married	Parietal
598	Dr. Leslie, Alton	1874 Jan.	55	Married	Parietal
599	Hospital	„ Jan.	24	Single	None
600	Mr. Winter, Brighton	„ Jan.	50	Single	Parietal
601	Mr. Nunn, Colchester	„ Jan.	32	Single	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	17 pounds	6 inches	Recovered	Well in 1875. Died March 1881 of kidney disease	561
Clamp . .	22 „	5 „	Recovered	No report	562
Clamp . .	19 „	5 „	Recovered	Well in 1881	563
Clamp . .	125 „	6 „	Recovered	Returned to Brazil. Well in 1881	564
Clamp . .	24 „	5 „	Died, 5th day	Septic peritonitis	565
Clamp . .	14 „	5 „	Recovered	Five children since operation, 1874–76–78–79–81. Well in 1881	566
Clamp . .	26 „	5 „	Recovered	Died of peritonitis, 1879	567
Clamp . .	21 „	5 „	Recovered	Boy still-born, 1875. Girl born 1876. Well in 1881	568
Ligature . .	10 „	5 „	Recovered	No report	569
Ligature . .	34 „	5 „	Recovered	Child born August 1874. No report since	570
Clamp . .	27 „	5 „	Recovered	Well in 1881	571
Ligature . .	26 „	5 „	Recovered	No report	572
Clamp . .	17 „	5 „	Recovered	Married 1879. Well in 1881	573
Clamp . .	9 „	6 „	Died, 49 hours	Peritonitis	574
Clamp		5 „	Recovered	Well in 1881	575
Ligature . .	40 „	5 „	Recovered	Well in 1881	576
Clamp . .	33 „	5 „	Recovered	Well in 1881	577
Pin and ligature	16 „	6 „	Died, 32 hours	Exhaustion	578
Clamp . .	13 „	5 „	Recovered	Well in 1881	579
Clamp . .	13 „	5 „	Recovered	Well in 1881	580
Clamp . .	50 „	5 „	Died, 28 hours	Exhaustion	581
Clamp		5 „	Recovered	Well in 1881	582
Ligature . .	18 „	5 „	Recovered	Well in 1881. Had twelve children before operation—one of them operated on for same disease 1869	583
Sewed to abdominal wall	18 „	5 „	Died, 24th day	Pyæmic fever	584
Clamp . .	12 „	5 „	Recovered	Well in 1876. No report since	585
Clamp . .	15 „	5 „	Recovered	Two boys and two girls since—born 1875–76–77–80. Well in 1881	586
Clamp . .	12 „	5 „	Recovered	Died Oct. 1879—ascites, uterine myoma	587
Clamp . .	22 „	5 „	Recovered	Well in 1881	588
Clamp . .	21 „	6 „	Recovered	Well in 1876. No report since	589
Clamp . .	20 „	6 „	Died, 8th day	Septicæmia	590
Clamp . .	19 „	4 „	Recovered	Well in 1881	591
Clamp . .	22 „	5 „	Died, 7th day	Septicæmia	592
Clamp . .	15 „	5 „	Recovered	Married 1876—two boys, one girl. Well in 1881	593
Clamp		4 „	Recovered	Well in 1881	594
Clamp . .	21 „	5 „	Recovered	Well in 1876. No report since	595
Clamp . .	32 „	5 „	Recovered	Well in 1881	596
Ligature . .	24 „	6 „	Died, 21 hours	Exhaustion	597
Clamp . .	21 „	5 „	Died, 53 hours	Exhaustion	598
Clamp . .	35 „	5 „	Recovered	Well in 1876—died in 1879 of disease of liver	599
Clamp . .	46 „	5 „	Recovered	Well in 1881	600
Clamp . .	12 „	4 „	Recovered	Well in 1876—uterine hæmatocele in 1881—still alive	601

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
602	Hospital	1874 Jan.	33	Married	Omental
603	Hospital	„ Jan.	22	Single	None
604	Dr. Lane, San Francisco	„ Jan.	8	Single	None
605	Dr. Highmore, Bradford-on-Avon	„ Jan.	39	Single	None
606	Hospital	„ Feb.	30	Married	Omental
607	Hospital	„ Feb.	49	Married	None
608	Professor Dohrn, Marburg, Prussia	„ Feb.	33	Married	None
609	Dr. Clifton, Leicester	„ Feb.	52	Married	Parietal
610	Hospital	„ Feb.	51	Single	Omental
611	Dr. Wyman, Putney	„ Feb.	25	Single	Intestinal
612	Hospital	„ Feb.	52	Single	None
613	Mr. Pilcher, Boston	„ Feb.	49	Married	None
614	Dr. Neil Arnott	„ March	63	Married	None
615	Hospital	„ March	48	Married	Omental and parietal
616	Hospital	„ March	53	Married	Omental, parietal, and intestinal
617	Dr. Borland, Boston, U.S.	„ March	20	Single	None
618	Hospital	„ March	50	Married	Parietal
619	Hospital	„ April	47	Married	Omental
620	Hospital	„ April	24	Single	Omental and intestinal
621	Mr. Barrett, Pewsey, Wilts	„ April	53	Married	Omental
622	Dr. Monro, Barnard Castle	„ April	44	Married	Parietal
623	Hospital	„ April	45	Widow	None
624	Hospital	„ April	29	Single	Parietal
625	Dr. Thomson, Torquay	„ April	32	Married	None
626	Mr. Woodward, Tooting	„ May	35	Married	Omental and parietal
627	Mr. Harper, Holbeach	„ May	31	Married	Parietal, omental, and vesical
628	Hospital	„ May	47	Married	Omental and parietal
629	Mr. Nicholson, Stratford	„ May	20	Single	None
630	Hospital	„ May	46	Married	Intestinal and uterine
631	Dr. Bright, Forest Hill	„ May	62	Married	None
632	Hospital	„ May	52	Married	Parietal
633	Mr. Everett, Worcester	„ May		Married	None
634	Dr. Britton, Clifton	„ May	47	Married	Omental
635	Dr. Veit, Bonn	„ May	27	Married	None
636	Hospital	„ May	30	Single	None
637	Hospital	„ June	34	Married	Parietal
638	Hospital	„ June	34	Married	None
639	Mr. Baker, Birmingham	„ June	45	Married	Pelvic and omental
640	Dr. Veit, Bonn	„ June	30	Single	None
641	Hospital	„ June	20	Single	None
642	Dr. Wyld	„ June	54	Married	None
643	Dr. Swayne, Clifton	„ June	48	Married	Parietal and pelvic

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	24 pounds	5 inches	Recovered	Boy born March 1877—well in 1881	602
Ligature . .	16 „	4 „	Recovered	Married Sept. 1880. Well in 1881	603
Ligature . .	2 „	4 „	Recovered	Well in 1881	604
Clamp . .	17 „	5 „	Recovered	Died Aug. 1875—cancer of pedicle	605
Clamp . .	24 „	6 „	Recovered	No report	606
Clamp . .	17 „	5 „	Recovered	No report	607
Clamp . .	16 „	4 „	Recovered	Well in 1881	608
Clamp . .	15 „	5 „	Recovered	Well in 1881	609
Clamp . .	26 „	5 „	Died, 4th day	Congestion of lungs	610
Clamp . .	20 „	4 „	Recovered	Died of phthisis	611
Clamp . .	12 „	5 „	Died, 17th day	Clot in cerebral sinuses	612
Clamp . .	16 „	5 „	Recovered	Well in 1881	613
Clamp . .	20 „	5 „	Died, 2nd day	Pulmonary congestion	614
Ligature . .	14 „	. .	Recovered	Well in 1881	615
Clamp . .	21 „	. .	Recovered	Well in 1876. No report since	616
Clamp . .	8 „	4 „	Recovered	Married 1877—two children 1878-80. Well in 1881	617
Clamp . .	28 „	5 „	Recovered	Well in 1881	618
Clamp . .	26 „	5 „	Recovered	Died after another ovariotomy in hospital, Boston, U.S., in 1878	619
Clamp . .	16 „	5 „	Recovered	Boy born July 1876. No report since	620
Clamp . .	. . .	5 „	Recovered	Well in 1881	621
Clamp . .	17 „	5 „	Died, 9th day	Purulent peritonitis	622
Clamp . .	12 „	4 „	Recovered	No report	623
Clamp . .	8 „	4 „	Recovered	Well in 1881	624
Clamp . .	10 „	5 „	Recovered	Well in 1881	625
Clamp . .	47 „	6 „	Died, 3rd day	Septic peritonitis	626
Clamp . .	15 „	6 „	Recovered	Well in 1881	627
Clamp . .	30 „	5 „	Died, 5th day	Septic peritonitis	628
Clamp . .	8 „	4 „	Died, 4th day	Septicæmia	629
Clamp . .	24 „	5 „	Died, 5th day	Septic peritonitis	630
Clamp . .	12 „	5 „	Recovered	Died 1875. Heart disease	631
Clamp . .	27 „	5 „	Recovered	No report	632
Clamp and ligature. Both ovaries	10 „	6 „	Recovered	Well in 1881	633
Clamp . .	32 „	6 „	Died, 22 hours	Septicæmia	634
Clamp . .	12 „	5 „	Recovered	Well in 1876 ; abortion in 1879. Well in 1881	635
Clamp and ligature. Both ovaries	27 „	5 „	Recovered	Well in 1876. No report since	636
Clamp . .	28 „	5 „	Died, 3rd day	Hæmorrhage and septicæmia	637
Clamp . .	21 „	5 „	Recovered	Well in 1881	638
Clamp . .	18 „	5 „	Died, 5th day	Peritonitis	639
Clamp . .	9 „	5 „	Died, 11th day	Clot in pulmonary artery	640
Clamp . .	12 „	4 „	Recovered	Died, 1880, of phthisis	641
Clamp . .	15 „	5 „	Recovered	Well in 1881	642
Clamp and ligature. Both ovaries	16½ „	5 „	Died, 50 hours	Septicæmia	643

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
644	Hospital	1874 June	58	Married	Omental
645	Hospital	„ June	58	Married	Omental and parietal
646	Hospital	„ July	26	Married	Omental
647	Dr. Winckel, Dresden	„ July	24	Married	Parietal and omental
648	Dr. Gage Brown	„ July	39	Married	Omental
649	Mr. Hewer	„ July	54	Single	Parietal
650	Dr. Magrath, Teignmouth	„ July	16	Single	Parietal, omental, and intestinal
651	Dr. Roberts, Port Madoc	„ July	62	Married	None
652	Hospital	„ July	37	Married	Intestinal, vesical, and uterine
653	Mr. Hewlett, Harrow	„ July	25	Single	None
654	Hospital	„ Aug.	24	Single	None
655	Mr. Burton, Blackheath	„ Aug.	32	Married	None
656	Dr. Horsford, Stratford	„ Oct.	40	Married	Parietal and omental
657	Hospital	„ Oct.	25	Single	None
658	Mr. Walker, Wakefield	„ Oct.	41	Widow	None
659	Dr. Owen Rees	„ Oct.	54	Married	Parietal and omental
660	Hospital	„ Nov.	24	Married	Parietal, omental, vesical, and uterine
661	Mrs. Garrett-Anderson	„ Nov.		Single	None
662	Hospital	„ Nov.	54	Single	Parietal and omental
663	Mr. Coates, Salisbury	„ Nov.	54	Married	None
664	Dr. Pauly, Ebersvalde	„ Nov.	42	Married	None
665	Dr. Gordon, Belfast	„ Nov.	27	Married	Parietal
666	Mr. Clover	„ Dec.	24	Single	Parietal
667	Dr. Wood, New York	„ Dec.	45	Married	Uterine
668	Mr. Taylor, Guildford	„ Dec.	55	Single	Omental and intestinal
669	Hospital	„ Dec.	35	Single	Omental
670	Sir W. Gull, Bart.	„ Dec.	16	Single	None
671	Hospital	„ Dec.	21	Single	Parietal and uterine
672	Hospital	1875 Jan.	51	Widow	Omental
673	Hospital	„ Jan.	15	Single	None
674	Mr. Payne, Cambridge	„ Jan.	31	Single	Parietal
675	Dr. Wharton Hood	„ Jan.		Married	Parietal and mesenteric
676	Hospital	„ Jan.	57	Married	Parietal
677	Mr. Forster, Daventry	„ Jan.	34	Single	Omental
678	Hospital	„ Jan.	44	Single	Parietal, intestinal, and pelvic
679	Hospital	„ Jan.	49	Married	Parietal
680	Hospital	„ Jan.	38	Married	Omental
681	Dr. Fawcett, Cambridge	„ Feb.	30	Single	Omental
682	Hospital	„ Feb.	47	Single	Parietal
683	Dr. Lanchester, Croydon	„ Feb.	25	Married	Parietal and omental
684	Dr. Prell, Hamburg	„ Feb.	39	Married	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Ligature . .	27 pounds	6 inches	Died, 32 hours	Septicæmia	644
Ligature. Both ovaries	18 „	5 „	Died, 5th day	Septic peritonitis	645
Clamp . .	16½ „	5 „	Recovered	One child born within a twelvemonth, three others since, 1877–78–79. Well in 1881	646
Clamp . .	. . .	4 „	Recovered	Child born in 1880. Well in 1881	647
Clamp . .	24 „	5 „	Recovered	Child born December 1875. Well in 1881	648
Clamp . .	21 „	. .	Recovered	Well in 1881	649
Clamp . .	10 „	6 „	Recovered	Well in 1881.	650
Clamp . .	13 „	4 „	Recovered	No report	651
Clamp and ligature	33 „	6 „	Died, 26 hours	Peritonitis	652
Ligature. Both ovaries	20 „	5 „	Recovered	Married 1876. Well in 1881. Not menstruated since operation	653
Clamp . .	20 „	5 „	Recovered	Married 1879. Well in 1881	654
Clamp . .	38½ „	5 „	Died, 50 hours	Septicæmia	655
Ligature . .	14 „	5 „	Recovered	Died in 1875 of cancer	656
Clamp . .	17½ „	5 „	Recovered	No report	657
Clamp . .	11 „	5 „	Recovered	Well in 1881	658
Ligatures. Both ovaries	55 „	8 „	Recovered	Died Feb. 1875	659
Clamp . .	16 „	5 „	Recovered	Girl 1876 — miscarriage 1877—boys 1878–80. Well in 1881	660
Ligatures. Both ovaries	10 „	5 „	Recovered	Well in 1881	661
Clamp . .	15 „	5 „	Recovered	Well in 1881	662
Clamp . .	13 „	. .	Recovered	Well in 1876. No report since	663
Clamp and ligature. Both ovaries	12 „	5 „	Recovered	Well in 1881	664
Clamp . .	9 „	5 „	Recovered	Child born Oct. 1876. No report since	665
Clamp . .	15 „	5 „	Recovered	Well in 1881	666
Ligature . .	10 „	5 „	Died, 13th day	Obstruction of intestine	667
Ligatures. Both ovaries	15 „	6 „	Died, 30 hours	Peritonitis	668
Clamp . .	17 „	6 „	Died, 4th day	Septicæmia	669
Clamp . .	18 „	4 „	Recovered	Well and married in 1881	670
Clamp . .	41 „	5 „	Recovered	Well in 1876. No report since	671
Clamp . .	9 „	5 „	Recovered	Well in 1876. No report since	672
Clamp . .	2 „	3 „	Recovered	Died of broncho-pneumonia May 1875	673
Clamp . .	26 „	5 „	Recovered	Married 1880—boy 1881. Well	674
Clamp . .	13 „	5 „	Recovered	Well in 1881	675
Clamp . .	4 „	5 „	Recovered	Well in 1881	676
Ligature . .	14 „	5 „	Recovered	Well in 1881	677
Clamp . .	4 „	4 „	Died, 28 hours	Peritonitis	678
Clamp . .	13 „	5 „	Died, 8th day	Septicæmia	679
Clamp . .	30 „	5 „	Recovered	No report	680
Clamp . .	11 „	5 „	Recovered	Died 1877	681
Clamp .	11 „	5 „	Recovered	Well in 1881	682
Clamp . .	. . .	4 „	Recovered	Boy 1878, girl 1880. Well in 1881	683
Clamp . .	10 „	4 „	Recovered	Well in 1881	684

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
685	Hospital	1875 Feb.	25	Single	None
686	Hospital	„ Feb.	16	Single	None
687	Dr. Weir, Malvern	„ Feb.	64	Married	No true pedicle
688	Hospital	„ Feb.	32	Married	Parietal and omental
689	Dr. Griffith, Camberwell	„ March	36	Single	None
690	Hospital	„ March	30	Single	Pelvic
691	Hospital	„ March	38	Married	Parietal and omental
692	Dr. Pagenkopff, Moscow	„ March	55	Married	Intestinal, uterine, &c.
693	Dr. Hill, Lymington	„ March	60	Single	None
694	Dr. Rice	„ April		Married	Parietal and omental
695	Dr. Manifold, Liverpool	„ April	56	Married	Parietal and omental
696	Mr. Robinson, Bedford	„ April		Married	None
697	Mr. Shepherd, Worcester	„ April	24	Single	None
698	Dr. Goldschmidt, Hamburgh	„ April	39	Married	None
699	Dr. Newman, Stamford	„ April	63	Married	Omental
700	Hospital	„ April	46	Married	Omental
701	Hospital	„ April	46	Single	Parietal, omental, and between the two tumours
702	Dr. Holman, Reigate	„ May	23	Single	Parietal
703	Dr. Kugler, Stettin	„ May	34	Married	None
704	Mr. Dodd	„ May	27	Single	None
705	Mr. Barker	„ May		Married	Parietal and omental
706	Mr. Orton, Narborough	„ May		Married	None
707	Hospital	„ May	24	Single	None
708	Hospital	„ June	46	Married	Omental and intestinal
709	Mr. Blackstone	„ June	47	Widow	Omental
710	Dr. Symes Thompson	„ June	18	Single	None
711	Dr. Griffith, Swansea	„ June	24	Single	None
712	Mr. Copestake, Derby	„ June	57	Single	Parietal, omental, and intestinal
713	Hospital	„ June	70	Widow	Intestinal
714	Hospital	„ June	32	Married	Omental
715	Dr. Rooke, Cheltenham	„ July	33	Married	Omental
716	Mr. Turner, Hereford	„ July	33	Married	Omental and intestinal
717	Hospital	„ July	52	Married	Omental
718	Dr. Johnson, Tunbridge Wells	„ July	60	Single	Omental and intestinal
719	Hospital	„ July	46	Widow	Omental
720	Dr. Dill, Brighton	„ July	39	Single	None
721	Hospital	„ Oct.	29	Married	Parietal and omental
722	Hospital	„ Oct.	31	Married	Parietal and omental
723	Hospital	„ Oct.	45	Single	Parietal, omental, uterine, and vesical
724	Mr. F. Hutchinson	„ Oct.	31	Single	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp. Both ovaries	22 pounds	5 inches	Recovered	Married 1879. Well in 1881	685
					686
Clamp . .	14 „	5 „	Recovered	Well in 1881	
Clamp . .	15 „	5 „	Recovered	Died after removal of a tumour of the pedicle 1880	687
Clamp . .	9 „	5 „	Recovered	Two girls 1876-78. Well in 1881	688
Clamp . .	20 „	5 „	Died, 3rd day	Peritonitis	689
Clamp . .	22 „	5 „	Recovered	Well Dec. 1876. No report since	690
Ligature . .	55 „	6 „	Recovered	Child born July 1876. Died April 1879 of cancer	691
Clamp and ligature	33 „	6 „	Died	Obstruction of intestine	692
Clamp . .	14 „	5 „	Recovered	Well in 1881	693
Clamp .	22 „	5 „	Recovered	Well in 1876. No report since	694
Clamp . .	13 „	5 „	Recovered	Well in 1881	695
Clamp . .	. . .	5 „	Recovered	Still-born boy April 1876. Died Dec. 1877 of cancer of uterus	696
Clamp . .	11 „	4 „	Recovered	Well in 1881	697
Clamp . .	10 „	4 „	Recovered	Well in 1881	698
Ligature . .	15 „	6 „	Recovered	Well Dec. 1876. Died 1881	699
Clamp . .	22 „	6 „	Recovered	Well in 1881	700
Ligatures (both pedicles)	20 „	7 „	Died, 26 hours	Exhaustion	701
Clamp . .	14 „	4 „	Died, 3rd day	Septicæmia	702
Clamp . .	77 „	5 „	Recovered	Well in 1881	703
Clamp . .	9 „	4 „	Recovered	Married Oct. 1875—three girls 1877–78–79. Well in 1881	704
Clamp . .	. . .	5 „	Recovered	Well in 1876. Second operation in 1880. Well in 1881	705
Clamp . .	10 „	5 „	Recovered	Well in 1876. No report since	706
Clamp . .	19 „	6 „	Recovered	Married April 1881—pregnant in Sept. Well	707
Clamp . .	42	7 „	Died, 10th day	Peritonitis	708
Clamp . .	26 „	5 „	Recovered	Well in 1881	709
Ligature . .	4 „	6 „	Died, 9th day	Peritonitis	710
Ligature . .	. . .	5 „	Recovered	Well in 1876. No report since	711
Ligature. Both ovaries.	13 „	5 „	Recovered	Died Oct. 1876. Cancer	712
Clamp . .	29 „	5 „	Recovered	Well in 1881	713
Ligature . .	19 „	5 „	Died, 6th day	Septicæmia	714
Clamp . .	21 „	5 „	Recovered	Well in 1881	715
Clamp . .	11 „	5 „	Recovered	Boy in 1877, miscarriage 1879. Well in 1881	716
Clamp . .	22 „	5 „	Recovered	Well in 1881	717
Clamp . .	10 „	5 „	Recovered	Well in 1881	718
Clamp . .	26 „	6 „	Recovered	Well in 1881	719
Clamp . .	5 „	7 „	Died, 6th day	Septicæmia	720
Clamp . .	12 „	5 „	Recovered	Three girls since operation, born 1876–78–80. Well in 1881	721
Clamp . .	33 „	5 „	Recovered	Well and pregnant 1876. No report since	722
Clamp . .	28 „	6 „	Died, 3rd day	Septicæmia	723
Clamp . .	12 „	4 „	Recovered	Well in 1881	724

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
725	Hospital	1875 Oct.	40	Married	Omental
726	Hospital	„ Nov.	25	Single	None
727	Dr. Edis	„ Nov.	51	Married	Parietal and omental
728	Hospital	„ Nov.	59	Widow	Parietal and omental
729	Dr. Percy Boulton	„ Nov.	24	Single	Parietal, omental, intestinal, and uterine.
730	Mr. J. W. Allen	„ Nov.	54	Widow	None
731	Hospital	„ Nov.	28	Single	Parietal and omental
732	Hospital	„ Nov.	29	Single	None
733	Sir H. Thompson	„ Nov.	21	Single	None
734	Mr. Edgar Barker	„ Nov.	38	Widow	Intestinal
735	Mr. Foster, Huntingdon	„ Nov.	39	Single	Omental
736	Dr. Lowe, Lynn	„ Dec.	25	Single	None
737	Dr. Scott, Huddersfield	„ Dec.	35	Single	None
738	Mr. Morant Baker	1876 Jan.	28	Single	None
739	Hospital	„ Jan.	52	Single	Omental
740	Dr. Smart, Hackney	„ Jan.	45	Married	Parietal, omental, and intestinal
741	Mr. Manifold, Liverpool	„ Jan.	36	Married	Parietal
742	Hospital	„ Jan.	27	Married	None
743	Mr. Proctor, Tunstall	„ Jan.	35	Married	None
744	Hospital	„ Feb.	27	Single	Parietal
745	Dr. Norton	„ Feb.	36	Married	Parietal and omental
746	Dr. Bright, Forest Hill	„ Feb.	23	Single	Intestinal
747	Dr. Herzfeld, Hamburg	„ Feb.	54	Single	Omental
748	Hospital	„ Feb.	32	Married	Omental and pelvic
749	Dr. Neftel, New York	„ Feb.	26	Single	None
750	Hospital	„ Feb.	27	Single	None
751	Hospital	„ March	48	Married	Pelvic
752	Dr. Kidd, Dublin	„ March	36	Married	Parietal and omental. Pregnancy
753	Hospital	„ March	26	Single	Omental
754	Dr. Frasch, Naugard	„ April	42	Single	Parietal and omental
755	Dr. De Roubaix, Brussels	„ April	32	Married	Parietal, omental, and vesical
756	Dr. Day	„ April	27	Married	None
757	Hospital	„ April	39	Married	Parietal and omental
758	Dr. Kidd	„ April		Single	Omental
759	Mr. Whittington, Tuxford	„ April	53	Married	Parietal
760	Hospital	„ April	26	Single	Omental
761	Hospital	„ April	66	Married	Parietal
762	Mr. Harrison, Chester	„ April	59	Married	Omental and mesenteric
763	Hospital	„ May	47	Single	None
764	Hospital	„ May	21	Single	None
765	Hospital	„ May	30	Married	None
766	Dr. M'Clintock, Dublin	„ May	18	Single	None
767	Hospital	„ May	51	Married	Parietal and omental
768	Dr. Thomson, Armagh	„ May	56	Single	Parietal

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	12 pounds	5 inches	Recovered	Well in 1881	725
Clamp and ligature. Both ovaries	30 „	5 „	Died, 2nd day	Septicæmia	726
Clamp . .	20 „	5 „	Recovered	Well in 1881	727
Ligature . .	15 „	5 „	Recovered	Well June 1876. No report since	728
Clamp . .	25 „	5 „	Died, 8th day	Exhaustion (?)	729
Clamp . .	13 „	5 „	Recovered	Well in 1876. Died Oct. 1879 of meningitis	730
Clamp . .	29 „	5 „	Died, 45 hours	Septic peritonitis	731
Clamp . .	41 „	5 „	Recovered	Well Nov. 1876. No report since	732
Clamp . .	11 „	4 „	Recovered	Married 1880. Well in 1881	733
Clamp . .	29 „	5 „	Recovered	Well in 1881	734
Clamp . .	10 „	4 „	Recovered	Well in 1881	735
Clamp . .	6 „	4 „	Recovered	Well Nov. 1876. Died of cancer 1880	736
Clamp . .	14 „	4 „	Died, 19th day	Intestinal obstruction	737
Clamp . .	15 „	5 „	Died, 2nd day	Septicæmia	738
Clamp . .	10 „	5 „	Recovered	Well in 1881	739
Clamp . .	17 „	6 „	Recovered	Well in 1881	740
Clamp . .	11 „	5 „	Recovered	Well in 1881	741
Clamp . .	9 „	4 „	Recovered	Well in 1881	742
Clamp . .	47 „	5 „	Recovered	Well Nov. 1876. No report since	743
Clamp . .	13 „	5 „	Recovered	Well Nov. 1876. Died 1879	744
Clamp . .	15 „	5 „	Recovered	Well in 1881	745
Clamp . .	9 „	5 „	Recovered	Well in 1881	746
Ligature . .	15 „	5 „	Died, 6th day	Cancer	747
Clamp . .	11 „	5 „	Recovered	Well and pregnant Dec. 1876. No report since	748
Clamp . .	9 „	4 „	Recovered	Well in 1881	749
Clamp . .	16 „	5 „	Recovered	Well in 1881	750
Clamp . .	8 „	5 „	Recovered	Well Dec. 1876. No report since	751
Ligature		5 „	Died, 7th day	Exhaustion after delivery	752
Clamp . .	11 „	5 „	Recovered	Well in 1881	753
Clamp . .	31 „	6 „	Died, 6th day	Peritonitis	754
Ligatures. Both ovaries	20 „	5 „	Died, 8 weeks	Pelvic abscess	755
Clamp . .	10 „	5 „	Recovered	Well, Dec. 1876. No report since	756
Clamp . .	26 „	6 „	Recovered	Well Nov. 1876. No report since	757
Ligatures. Both ovaries	15 „	5 „	Recovered	Well in 1881	758
Clamp		5 „	Recovered	Well in 1881.	759
Clamp . .	9 „	5 „	Died, 7th day	Septic peritonitis	760
Clamp . .	19 „	5 „	Recovered	Well in 1881	761
Ligature . .	25 „	5 „	Recovered	Well Dec. 1876. Died of cancer 1877	762
Clamp and ligature. Both ovaries	19 „	5 „	Recovered	Well in 1881	763
Clamp . .	9 „	5 „	Recovered	Died Oct. 1876—cancer	764
Clamp . .	18 „	5 „	Recovered	No report	765
Clamp . .	23 „	5 „	Recovered	Married May 1877—girl born 1880. Well in 1881	766
Clamp . .	23 „	5 „	Recovered	Well in 1881	767
Clamp . .	17 „	5 „	Recovered	Well in 1881	768

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
769	Hospital	1876 May	23	Single	None
770	Hospital	„ June	34	Single	Parietal and intestinal
771	Hospital	„ June	41	Married	Omental
772	Hospital	„ June	29	Single	Parietal
773	Mr. Nason, Stratford-on-Avon	„ June	54	Single	None
774	Dr. Priestley	„ June	46	Married	None
775	Hospital	„ June	36	Single	None
776	Hospital	„ June	29	Single	None
777	Hospital	„ July	20	Single	None
778	Dr. Iliewicz, Jerusalem	„ July	18	Single	None
779	Hospital	„ July	27	Single	Parietal, omental, uterine, and the two ovaries bound together.
780	Mr. Lowe, Burton-on-Trent	„ July	48	Married	Parietal and omental
781	Hospital	„ July	47	Single	None
782	Mr. Rigden, Lewes	„ July	77	Single	Parietal, omental, and vesical
783	Sir. H. Thompson	„ July	52	Single	Parietal and intestinal
784	Mr. Archer	„ July	37	Single	Parietal, hepatic, and intestinal
785	Dr. Coates, Bath	„ July	32	Single	None
786	Dr. Hawkesley	„ July	27	Single	None
787	Hospital	„ July	31	Single	None
788	Mr. Ceely, Aylesbury	„ July	47	Single	None
789	Dr. Hodder, Toronto	„ Aug.	46	Married	Intestinal, pelvic, and uterine
790	Mr. Crosby, Salford	„ Aug.	34	Married	Omental
791	Sir William Gull, Bart.	„ Aug.	46	Married	None
792	Dr. Schonfeldt, Labes	„ Aug.	38	Single	None
793	Mr. Hodgson, Brighton	„ Sept.	51	Married	Parietal and omental
794	Dr. Clarke, Huddersfield	„ Sept.	52	Married	Omental
795	Hospital	„ Oct.	54	Single	Parietal
796	Dr. Cardozo, Richmond	„ Oct.	45	Single	None
797	Hospital	„ Oct.	29	Single	Intestinal, vesical, and uterine
798	Dr. Roberts	„ Oct.	41	Married	None. Pregnant
799	Hospital	„ Oct.	26	Single	Parietal
800	Hospital	„ Oct.	33	Married	Intestinal and pelvic
801	Dr. Daley, Hull	„ Oct.	50	Single	None
802	Mr. Mould	„ Oct.	64	Widow	Omental
803	Hospital	„ Oct.	25	Single	Parietal and omental
804	Dr. Giles, Oxford	„ Oct.	30	Single	None
805	Mr. Appleby, Newark	„ Oct.	32	Widow	Omental
806	Mr. Tarleton, Stockton	„ Oct.	28	Married	Parietal
807	Hospital	„ Nov.	39	Single	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	2 pounds	4 inches	Recovered	Well Dec. 1876. No report since	769
Clamp . .	14 „	5 „	Died, 5th day	Septic peritonitis	770
Clamp . .	30 „	5 „	Recovered	Well in 1881	771
Ligature . .	14 „	5 „	Recovered	Well Nov. 1876. No report since	772
Ligature . .	24 „	5 „	Recovered	Well in 1881	773
Ligature. Both ovaries	13 „	5 „	Recovered	Well Nov. 1876. Died in 1879—cancer of kidney	774
Clamp . .	16 „	5 „	Recovered	Well in 1881	775
Ligature . .	13 „	5 „	Recovered	Well in 1881	776
Clamp . .	10 „	5 „	Recovered	Well in 1881. Works in telegraph office 'as well as any there'	777
Clamp . .	19 „	5 „	Recovered	Well in 1881	778
Ligature . .	5 „	5 „	Died, 4th day	Septicæmia	779
Clamp . .	12 „	5 „	Died, 7th day	Peritonitis	780
Clamp . .	24 „	4 „	Recovered	Well in 1881	781
Clamp . .	23 „	5 „	Died, 6th day	Exhaustion	782
Ligature		5 „	Died, 10th day	Peritonitis	783
Clamp . .	43 „	6 „	Recovered	Well Dec. 1876. No report since	784
Clamp . .	9 „	5 „	Recovered	Well in 1881	785
Clamp . .	7 „	5 „	Recovered	Well in 1881	786
Clamp . .	15 „	5 „	Recovered	Well in 1881	787
Clamp and ligature. Both ovaries	18 „	5 „	Recovered	Well in 1881	788
Ligature . .	9 „	5 „	Recovered	Seen well May 1878. No report since	789
Ligature. Both ovaries	7 „	5 „	Recovered	Well in 1881	790
Clamp . .	7 „	5 „	Recovered	Second operation Nov. 1881. Well in December	791
Ligature . .	10 „	4 „	Recovered	Well in 1881	792
Clamp and ligature	12 „	5 „	Recovered	Well in 1881. Weighs 12 stones, and walks six miles a day	793
Clamp . .	12 „	5 „	Died, 14th day	Peritonitis	794
Clamp . .	44 „	5 „	Recovered	Well in 1881	795
Ligature. Both ovaries	16 „	5 „	Recovered	Married and well in 1881	796
Ligature . .	9 „	5 „	Recovered	Married 1880. Well in 1881	797
Clamp . .	7 „	4 „	Recovered	Pregnant and well Dec. 1876—girl born April 1877. Well in 1881	798
Clamp . .	31 „	4 „	Recovered	Well in 1881	799
Ligatures. Both ovaries	19 „	4 „	Died in 4 weeks	Peritonitis and tubercular cavities in lung	800
Ligature . .	12 „	4 „	Recovered	Well in 1881	801
Clamp . .	25 „	5 „	Recovered	Died Sept. 1878. Cancer of liver	802
Clamp . .	18 „	5 „	Recovered	Married 1880—boy 1881. Well in December	803
Ligatures. Both ovaries	11 „	4 „	Recovered	Well in 1881	804
Ligatures. Both ovaries	16 „	5 „	Recovered	No report	805
Clamp . .	12 „	5 „	Recovered	No report	806
Ligatures .	10 „	5 „	Recovered	No report	807

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
808	Dr. Paine, Cardiff	1876 Nov.	56	Married	Parietal. Suppurating cyst
809	Hospital	,, Nov.	23	Single	Parietal
810	Dr. Gage Brown	,, Nov.	21	Single	None
811	Hospital	,, Nov.	36	Married	Omental
812	Hospital	,, Nov.	19	Single	Omental
813	Hospital	,, Nov.	22	Single	Parietal and omental
814	Dr. Leadam	,, Nov.	34	Married	Parietal
815	Hospital	,, Dec.	36	Married	Intestinal and pelvic
816	Mr. E. Barker	,, Dec.	16	Single	Parietal and omental
817	Hospital	,, Dec.	27	Married	Parietal. Pregnant
818	Dr. Oldham, Brighton	,, Dec.	45	Married	Parietal and omental
819	Hospital	,, Dec.	36	Married	Parietal
820	Mr. Kingdon	,, Dec.	58	Widow	Pelvic
821	Hospital	1877 Feb.	27	Married	None
822	Mr. Bishop, Tonbridge	,, Feb.	45	Single	Omental
823	Dr. Priestley	,, Feb.	28	Married	Omental
824	Professor Humphry, Cambridge	,, Feb.	20	Single	None
825	Hospital	,, Feb.	41	Married	Parietal, intestinal, and omental
826	Dr. Leslie, Alton	,, Feb.	37	Married	Pelvic
827	Dr. Paul	,, Feb.	65	Single	None
828	Hospital	,, Feb.	34	Married	Omental
829	Hospital	,, March	39	Married	Parietal and omental
830	Dr. Brodie Sewell	,, March	55	Married	Parietal and omental
831	Hospital	,, March	47	Married	Parietal
832	Hospital	,, March	33	Widow	Intestinal and omental
833	Dr. Godson	,, March	33	Married	None
834	Mr. Carruthers, Runcorn	,, March	22	Single	None
835	Hospital	,, March	50	Single	Parietal
836	Dr. Myrtle, Harrogate	,, March	49	Single	Parietal and intestinal
837	Dr. March, Wandsworth	,, March	42	Married	None
838	Hospital	,, April	47	Widow	None
839	Hospital	,, April	32	Married	Pelvic
840	Dr. Nebel, Heidelberg	,, April	36	Married	Parietal and omental
841	Dr. Clark, Dunster	,, April	42	Single	Parietal, omental, and vesical
842	Hospital	,, April	25	Single	Parietal and omental
843	Dr. Cazenove	,, April	26	Single	None
844	Hospital	,, May	28	Married	Parietal and intestinal

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	19 pounds	5 inches	Recovered	Well in 1881	808
Ligatures .	16 ,,	5 ,,	Recovered	No report	809
Ligature . .	15 ,,	5 ,,	Recovered	Married in 1878. Died seven months after. Cancer of lung	810
Clamp . .	24 ,,	5 ,,	Recovered	No report	811
Clamp . .	28 ,,	5 ,,	Recovered	Well in 1881	812
Ligature . .	25 ,,	5 ,,	Recovered	Well in 1881	813
Clamp . .	11 ,,	5 ,,	Recovered	Three girls, born 1878–79–81. Well in 1881	814
Ligature . .	23 ,,	8 ,,	Recovered	Girl born 1879—pregnant and well in 1881	815
Ligature . .	13 ,,	5 ,,	Recovered	Well in 1881	816
Ligature . .	11 ,,	5 ,,	Recovered	Two boys born 1878–80. Well in 1881	817
Clamp . .	20 ,,	5 ,,	Recovered	Well in 1881	818
Clamp . .	23 ,,	5 ,,	Recovered	Well in 1881	819
Ligature. Both ovaries	40 ,,	6 ,,	Recovered	Well in 1881	820
Ligature . .	6 ,,	5 ,,	Recovered	Well in 1881	821
Ligature. Both ovaries	9 ,,	5 ,,	Recovered	Well in 1881	822
Clamp . .	13 ,,	5 ,,	Recovered	Three children since, one boy two girls—born 1877–79–81. Well	823
Clamp . .	14 ,,	4 ,,	Recovered	Well in 1881	824
Ligature . .	7 ,,	7 ,,	Recovered	One boy in 1878. Well in 1881	825
Ligature . .	16 ,,	5 ,,	Died, 5th day	Septic peritonitis	826
Clamp . .	27 ,,	5 ,,	Recovered	Well in 1881	827
Clamp and ligature. Both ovaries	27 ,,	5 ,,	Recovered	Well in 1881	828
Ligature . .	22 ,,	7 ,,	Recovered	Well in 1881	829
Ligature . .	33 ,,	5 ,,	Recovered	Died in 1880. Disease of liver	830
Ligature . .	19 ,,	6 ,,	Recovered	Died a few years after of malignant disease	831
Ligature . .	9 ,,	5 ,,	Recovered	Died June 1880 of colloid disease of peritoneum	832
Clamp . .	15 ,,	4 ,,	Died, 5th day	Septicæmia	833
Ligatures. Both ovaries	. . .	5 ,,	Recovered	Well in 1881—acting as schoolmistress	834
Ligature . .	7 ,,	5 ,,	Recovered	Died of bronchitis in 1878	835
Ligature. Both ovaries	9 ,,	5 ,,	Died, 5th day	Septicæmia	836
Ligature . .	7 ,,	5 ,,	Recovered	Died of cardiac disease Aug. 1877	837
Clamp . .	19 ,,	5 ,,	Recovered	No report	838
Ligature. Both ovaries . .	28 ,,	6 ,,	Died, 5th day	Septicæmia	839
Ligature. Both ovaries . .	32 ,,	5 ,,	Recovered	Well in 1881	840
Ligature. Three ovaries ? .	21 ,,	5 ,,	Died, 10 hours	Hæmorrhage	841
Clamp and ligature. Both ovaries. .	17 ,,	5 ,,	Recovered	Well in 1881	842
Clamp . .	9 ,,	5 ,,	Recovered	Well in 1881	843
Clamp . .	15 ,,	5 ,,	Recovered	Well in 1881	844

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
845	Hospital	1877 May	23	Single	None
846	Hospital	„ May	40	Married	None
847	Dr. Drake, Exeter	„ May	33	Married	Vesical
848	Dr. Manson, Chesterfield	„ June	54	Single	None
849	Mr. Greaves, Bishop's Waltham	„ June	28	Single	Parietal and omental
850	Dr. Stewart, Glanlough	„ June	46	Married	Parietal, intestinal, and pelvic
851	Hospital	„ June	27	Single	Parietal
852	Dr. Beddoe, Clifton	„ June	49	Married	Parietal and omental
853	Dr. Webb	„ June	45	Married	None
854	Mr. Coryn, Brixton	„ June	43	Single	None
855	Hospital	„ June	36	Single	Omental
856	Dr. Latham, Cambridge	„ June	40	Single	None
857	Dr. Drage, Hatfield	„ July	59	Married	None
858	Hospital	„ July	37	Single	Omental
859	Dr. Kinnear, Malmesbury	„ July	64	Widow	None
860	Hospital	„ July	28	Married	Parietal
861	Hospital	„ July	32	Married	Parietal and omental
862	Dr. Hermann, South Africa	„ July	36	Married	None
863	Dr. Lennard, Clifton	„ July	52	Married	Parietal, omental, and intestinal
864	Mr. Shaw, Sheffield	„ July	44	Widow	Parietal, omental, and hepatic
865	Hospital	„ July	27	Married	Omental
866	Hospital	„ July	23	Single	Mesenteric
867	Dr. Craig, Montreal, Canada	„ July	29	Married	Omental and parietal
868	Hospital	„ Aug.	39	Married	None
869	Mr. Winter, Brighton	„ Aug.	44	Married	Parietal
870	Dr. Aveling, Clapton	„ Sept.	31	Married	None
871	Dr. Tilley, Brigg	„ Sept.	49	Married	Omental
872	Dr. Grant	„ Sept.	59	Married	Intestinal
873	Hospital	„ Oct.	54	Widow	None
874	Mr. Pratt, Wivlescombe	„ Oct.	53	Single	Parietal
875	Hospital	„ Oct.	31	Married	Omental
876	Hospital	„ Oct.	18	Single	Parietal and omental
877	Dr. Hadden, Manchester	„ Nov.	26	Single	None
878	Hospital	„ Nov.	21	Single	None
879	Mr. Stirling	„ Nov.	28	Married	None. Pregnant
880	Hospital	„ Nov.	63	Married	Pelvic
881	Dr. Zanobini, Genoa	„ Nov.	26	Married	None
882	Mr. J. Murray, Brighton	„ Nov.	57	Widow	Omental
883	Dr. Cooper Key	„ Dec.	50	Married	Parietal
884	Hospital	„ Dec.	31	Single	None
885	Hospital	„ Dec.	34	Married	Omental and parietal
886	Hospital	„ Dec.	27	Married	Omental and parietal
887	Dr. M. Duncan	„ Dec.	59	Single	Intestinal

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Clamp . .	16 pounds	5 inches	Recovered	Married in 1879—miscarriage 1880. Well in 1881	845
Clamp . .	27 „	5 „	Recovered	Well in 1881	846
Clamp . .	10 „	5 „	Recovered	Died—cancer.	847
Ligature . .	29 „	4 „	Recovered	No report	848
Ligature. Both ovaries	15 „	4 „	Died, 36 hours	Hæmorrhage	849
Forceps and ligature	10 „	5 „	Died, 63 hours	Septicæmia	850
Clamp . .	7 „	4 „	Recovered	Well in 1881	851
Clamp . .	19 „	5 „	Recovered	Well in 1881	852
Ligature . .	17 „	5 „	Recovered	Well in 1881	853
Clamp . .	28 „	4 „	Recovered	No report	854
Ligature . .	10 „	5 „	Recovered	Well in 1881	855
Clamp . .	13 „	5 „	Recovered	Well in 1881	856
Ligature . .	13 „	6 „	Recovered	Well in 1881	857
Clamp . .	12 „	5 „	Died, 5th day	Septicæmia	858
Clamp . .	17 „	5 „	Recovered	Well in 1881	859
Clamp . .	21 „	5 „	Recovered	One child since. Well in 1881	860
Clamp . .	8 „	6 „	Recovered	Two children since operation. Well in 1881	861
Clamp		5 „	Recovered	Returned to Africa. Well when last heard of	862
Clamp . .	11 „	5 „	Died, 56 hours	Peritonitis	863
Clamp		5 „	Died, 8th day	Peritonitis	864
Ligature . .	13 „	9 „	Recovered	No report	865
Ligature. Both tubes	6 „	6 „	Recovered	Married in 1878. Well in 1881	866
Clamp		5 „	Recovered	Child born 1880, after return to Canada. Well in 1881	867
Clamp . .	35 „	6 „	Recovered	No report	868
Clamp		5 „	Recovered	Well in 1880	869
Clamp . .	15 „	5 „	Recovered	Well in 1881	870
Ligature . .	7 „	5 „	Recovered	Well in 1881	871
Ligature. Both ovaries	20 „	5 „	Died, 3rd day	Septic peritonitis	872
Clamp . .	33 „	5 „	Recovered	Well in 1881	873
Clamp . .	78 „	5 „	Died, 3rd day	Septicæmia	874
Clamp . .	18 „	5 „	Died, 5th day	Septicæmia	875
Clamp . .	29 „	5 „	Recovered	Well in 1881	876
Clamp		5 „	Died, 8th day	Septicæmia	877
Clamp . .	23 „	5 „	Recovered	Well in 1881	878
Clamp . .	10 „	4 „	Recovered	Three children born since. Well in 1881	879
Ligature . .	26 „	5 „	Recovered	Well in 1881	880
Clamp . .	19 „	5 „	Recovered	Well in 1881	881
Ligature . .	21 „	5 „	Died, 14th day	Peritonitis. Cancer	882
Clamp . .	17 „	5 „	Recovered	Well in 1880	883
Clamp . .	13 „	5 „	Recovered	Married 1878. Well in 1881	884
Clamp . .	15 „	5 „	Recovered	Well in 1881	885
Clamp . .	12 „	5 „	Recovered	Girl born 1880. Well in 1881	886
Ligature		5 „	Died, 9th day	Septicæmia	887

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
888	Dr. Frank, Cannes	1878 Jan.	49	Married	None
889	Mr. Gilbert, Hackney	„ Feb.	60	Widow	None
890	Dr. Mallett, Bolton	„ Feb.	29	Married	Omental. Burst cyst
891	Dr. Carpenter, Croydon	„ Feb.	41	Single	Parietal and omental
892	Mr. Clover	„ Feb.	44	Widow	None. Burst cyst
893	Mr. Morgan	„ March	63	Single	None
894	Dr. Cohn, Hamburg	„ April	21	Married	None
895	Dr. Way	„ April	52	Single	None
896	Mr. Robinson, Huddersfield	„ May	56	Widow	Omental. Burst cyst
897	Dr. Edith Pechey, Leeds	„ May	22	Single	Parietal
898	Dr. Brown, Rochester	„ June	22	Married	Omental
899	Mr. Johnston, Leicester	„ June	24	Married	None
900	Sir Risdon Bennett	„ June	57	Married	None
901	Dr. Ferguson, Belfast	„ June	31	Single	Pelvic
902	Dr. F. Farre	„ June	63	Single	None
903	Mr. Treves, Margate	„ June	68	Married	None
904	Mr. Marshall, Birmingham	„ July	68	Single	Intestinal
905	Mr. Hayes, Tittensor	„ July	33	Single	Cæcal
906	Mr. C. Hawkins, Cheltenham	„ July	42	Married	None
907	Mr. Hanks, Snaith	„ July	42	Single	None
908	Mr. Carver, Fulham	„ Aug.	40	Married	None
909	Dr. Walters, Reigate	„ Aug.		Married	Parietal and omental
910	Dr. Cronin	„ Aug.	61	Widow	Parietal. Suppurating cyst
911	Dr. Jack, Hampton Court	„ Aug.	63	Single	Parietal
912	Dr. Cumming, Belfast	„ Sept.	38	Married	Omental and intestinal
913	Mr. Manley Sims	„ Oct.	27	Married	Parietal and intestinal. Burst cyst
914	Mr. Cheyne	„ Oct.	50	Single	None
915	Mr. Evershed, Hampstead	„ Oct.	58	Widow	None
916	Mr. Collambell	„ Oct.	46	Married	Intestinal
917	Dr. Sanderson	„ Nov.	40	Single	Omental, paricta1, and pelvic
918	Dr. C. Pearce, Brixton	„ Nov.	59	Widow	Parietal and mesenteric
919	Dr. Bell, Preston	„ Nov.	46	Married	Parietal and intestinal
920	Dr. Rooke, Cheltenham	„ Nov.		Married	Parietal
921	Dr. Priestley	„ Dec.	61	Married	Parietal and intestinal
922	Dr. Duke, Norwood	„ Dec.	51	Married	Parietal and intestinal
923	Mr. T. Smith	1879 Jan.	32	Married	None
924	Dr. Holman, Reigate	„ Jan.	19	Single	None
925	Mr. Knaggs, Huddersfield	„ Feb.	46	Married	Parietal and omental
926	Mr. Riddle, Leamington	„ Feb.	59	Married	None
927	Mr. Covey, Alresford	„ Feb.	60	Single	None

Treatment of Pedicle	Weight of Tumour	Length of Incision	Results	Subsequent History or Cause of Death	No.
Ligature. Both ovaries (Battey)	. . .	3 inches	Recovered	Well in 1881	888
Ligature . .	23 pounds	5 ,,	Recovered	Died in 1879	889
Clamp . .	. . .	6 ,,	Recovered	Died of malignant disease (general) June 1878	890
Ligature . .	. . .	6 ,,	Recovered	Well in 1881	891
Ligature . .	. . .	5 ,,	Recovered	Died of phthisis in 1879	892
Ligature . .	22 ,,	5 ,,	Recovered	Well in 1880	893
Ligature. Both ovaries	. . .	5 ,,	Recovered	Well in 1881	894
Ligature . .	15 ,,	5 ,,	Recovered	Well in 1880	895
Ligature . .	9 ,,	4 ,,	Recovered	Well in 1881	896
Ligature . .	23 ,,	5 ,,	Recovered	Well in 1881	897
Ligatures .	8 ,,	4 ,,	Died, 7th day	Tetanus	898
Ligatures .	8 ,,	4 ,,	Recovered	Well in 1881	899
Ligatures .	18 ,,	5 ,,	Recovered	Well in 1881	900
Ligatures .	10 ,,	5 ,,	Recovered	Well in 1881	901
Ligatures .	18 ,,	5 ,,	Died, 4th day	Septicæmia	902
Ligatures. Both ovaries	. . .	5 ,,	Recovered	Died in 1879	903
Ligature . .	. . .	5 ,,	Recovered	Died in 1880—cancer	904
Ligature . .	33 ,,	4 ,,	Recovered	Married since—two children Well in 1881	905
Clamp . .	. . .	5 ,,	Recovered	Two children since. Well in 1881	906
Ligatures .	18 ,,	5 ,,	Recovered	Died of peritonitis in 1880 after exposure to cold	907
Ligatures .	7 ,,	5 ,,	Recovered	Well in 1881	908
Ligature . .	12 ,,	6 ,,	Recovered	Well in 1881	909
Clamp . .	31 ,,	6 ,,	Recovered	Well in 1881	910
Ligature. Both ovaries	31 ,,	5 ,,	Died, 7th day	Septicæmia	911
Ligature . .	22 ,,	6 ,,	Recovered	Well in 1880	912
Ligature . .	. . .	6 ,,	Recovered	Well in 1881	913
Ligature. Both ovaries	. . .	4 ,,	Recovered	Well in 1881	914
Ligature . .	22 ,,	6 ,,	Recovered	Well in 1881	915
Ligature . .	. . .	5 ,,	Recovered	Well in 1881	916
Ligature . .	15 ,,	5 ,,	Recovered	Died after removal of foreign body from bladder	917
Ligatures .	63 ,,	6 ,,	Died, 4th day	Bronchitis	918
Ligature . .	. . .	5 ,,	Recovered	Well in 1881	919
Ligature. Both ovaries	11 ,,	5 ,,	Recovered	Well in 1881	920
Ligature . .	21 ,,	5 ,,	Recovered	Well in 1881	921
Ligature . .	16 ,,	5 ,,	Recovered	Well in 1881	922
Ligatures .	. . .	5 ,,	Recovered	Well in 1881	923
Ligature . .	16 ,,	4 ,,	Recovered	Married and well in 1881	924
Ligatures. Both ovaries	. . .	5 ,,	Died, 7th day	Obstructed intestine	925
Ligatures .	16 ,,	5 ,,	Recovered	Well in 1881	926
Ligature . .	16 ,,	5 ,,	Recovered	Well in 1881	927

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
928	Dr. Lee, Hull	1879 Feb.	42	Single	None
929	Dr. Marion Sims	„ Feb.	45	Married	Cæcal
930	Dr. F. Weber	„ March	51	Single	None. Burst colloid
931	Dr. McDonnell, Dublin	„ March	36	Single	None
932	Dr. Greenidge, Barbadoes	„ March	19	Single	Parietal and omental
933	Mr. Bell, New Brighton	„ March	39	Single	Omental and intestinal
934	Mr. Parsons, Frome	„ March	59	Widow	None
935	Mr. Bishop, Tonbridge	„ March	19	Single	Omental
936	Dr. Waller, Sydenham	„ April	32	Married	Parietal
937	Dr. Jackson, Southsea	„ April	68	Single	None
938	Mr. Bickersteth, Liverpool	„ April	52	Single	None. Fallopian papilloma, ascites
939	Dr. Matheson	„ May	41	Married	Parietal and intestinal
940	Dr. Paget, Cambridge	„ May	54	Married	None
941	Mr. Whitling, Croydon	„ May	47	Married	Pelvic
942	Dr. Kidd, Dublin	„ May	34	Single	None
943	Dr. O'Connor	„ May	60	Married	Parietal, omental, and pelvic
944		„ May	28	Single	None
945	Dr. Higginbotham, St. Petersburg	„ May	36	Married	Parietal
946	Dr. Glover	„ May	61	Married	Omental
947	Dr. ——, Moscow	„ May	24	Married	Parietal and intestinal
948	Mr. Keetley, Grimsby	„ May	20	Single	Pelvic. Burst cysts
949	Dr. Hunter, Matlock	„ June	32	Single	None
950	Mr. Chapman, Tooting	„ June	62	Single	None
951	Mr. Furner, Brighton	„ June	33	Single	None
952	Mr. Newstead, Clifton	„ June	51	Single	None
953	Mr. Hewetson, York	„ June	38	Married	Pelvic
954	Mr. Johnson, Bedford	„ July	28	Single	None
955	Dr. H. Weber	„ July	50	Married	None
956	Dr. Muller, Norwood	„ July	13	Single	None
957	Dr. Stokes, Highbury	„ Aug.		Married	None
958	Dr. Aitken, Netley	„ Aug.	26	Single	None
959	Mr. Pocklington, Wimbledon	„ Sept.	44	Widow	Omental
960	Dr. Liddon, Taunton	„ Sept.	44	Widow	Parietal, omental, and intestinal
961	Dr. ——, Barbadoes	„ Sept.	36	Married	None
962	Dr. Macconchy, Downpatrick	„ Sept.	48	Single	Intestinal
963	Dr. Bezley Thorne	„ Oct.	63	Widow	Omental
964	Dr. Weil, Basle	„ Oct.	55	Married	None
965	Dr. Blaxall	„ Oct.	59	Married	None
966	Dr. Parson, San Francisco	„ Oct.	39	Single	None. Dermoid
967	Mr. James, Uxbridge	„ Oct.	25	Single	None
968	Dr. G. Anderson	„ Nov.	50	Single	None. Burst cyst

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Ligature. Both ovaries	19 pounds	5 inches	Recovered	Well in 1881	928
Ligature . .	7 „	5 „	Recovered	Well in 1881	929
Ligature . .	. . .	5 „	Recovered	Well in 1881	930
Ligature . .	. . .	4 „	Recovered	Well in 1881	931
Ligature . .	14 „	5 „	Recovered	Well in 1881	932
Ligature. Both ovaries	11 „	5 „	Died, 4th day	Septicæmia	933
Ligature . .	9 „	5 „	Recovered	Well in 1881	934
Ligature . .	16 „	5 „	Recovered	Well in 1881	935
Ligature . .	18 „	5 „	Recovered	Well in 1881	936
Ligature . .	15 fibroma, 26 ascites	10 „	Recovered	Well in 1881	937
Ligature . .	. . .	4 „	Recovered	Well in 1881	938
Ligature . .	. . .	5 „	Recovered	Well in 1881	939
Ligature . .	. . .	5 „	Recovered	Well in 1880	940
Ligature . .	. . .	5 „	Recovered	Well in 1880	941
Ligature . .	25 „	5 „	Recovered	Well in 1881	942
Ligature. Both ovaries	47 „	5 „	Recovered	Died 4 months after operation of bronchitis	943
Ligature . .	16 „	4 „	Recovered	No report	944
Ligature . .	. . .	5 „	Recovered	No report	945
Ligature. Both ovaries	20 „	5 „	Recovered	Well in 1881	946
Ligature. Both ovaries	10 „	6 „	Recovered	Well in 1880	947
Ligature. Both ovaries	20 „	5 „	Recovered	Well in 1881	948
Ligature . .	19 „	5 „	Recovered	Well in 1881	949
Ligature . .	13 „	5 „	Recovered	Well in 1881	950
Ligature . .	14 „	4 „	Recovered	Well in 1881	951
Ligature . .	. . .	4 „	Recovered	Well in 1881	952
Ligature. Both ovaries	10 „	5 „	Recovered	Well in 1881	953
Ligature . .	10 „	5 „	Recovered	Well in 1880	954
Ligature . .	28 „	5 „	Recovered	Well in 1880	955
Ligature . .	8 „	5 „	Recovered	Well in 1881	956
Ligature. Both ovaries	13 „	5 „	Recovered	Died 1880—phthisis	957
Ligature . .	15 „	5 „	Recovered	Well in 1881	958
Ligature . .	32 „	5 „	Recovered	Well in 1881	959
Ligature . .	7 „	5 „	Recovered	Well in 1881	960
Ligature . .	18 „	5 „	Recovered	No report	961
Ligature. Both ovaries	19 „	5 „	Recovered	No report	962
Ligature . .	7 „	8 „	Recovered	No report	963
Ligature . .	10 „	5 „	Recovered	Well in 1881	964
Ligature . .	13 „	5 „	Recovered	Well in 1880	965
Ligature . .	. . .	. . .	Recovered	Well in 1881	966
Ligature . .	. . .	5 „	Recovered	Well in 1881	967
Ligature . .	. . .	5 „	Recovered	Well in 1881	968

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
969	Dr. Wilberforce Smith	1879 Nov.	16	Single	None
970	Mr. Square, Plymouth	„ Nov.	34	Single	None
971	Mr. Douglas, Hounslow	„ Nov.	19	Single	Parietal, omental, and pelvic
972	Mr. Archibald, Brixton	„ Dec.		Widow	Omental
973	Dr. Sheehy	„ Dec.	50	Married	None
974	Mr. Lund, Manchester	„ Dec.	34	Married	None
975	Mr. J. Murray, Brighton	„ Dec.	65	Married	None
976	Mr. Bubb, Cheltenham	1880 Jan.	68	Single	Parietal and omental. Suppurating cyst.
977	Dr. Broxholm	„ Jan.	54	Married	Parietal, omental, and pelvic
978	Dr. W. Roberts, Manchester	„ Jan.	68	Single	None
979	Sir Risdon Bennett	„ Jan.	30	Single	None
980	Mr. Haffenden	„ Feb.	49	Married	None. Burst colloid
981	Mr. Dodd, Slough	„ Feb.	58	Single	Parietal and intestinal
982	Mr. Robey, Wandsworth	„ Feb.	55	Married	Parietal and omental
983	Dr. Reed, Manchester	„ March	37	Married	Intestinal. Burst cyst
984	Dr. Priestley	„ March	32	Married	None
985	Dr. Priestley	„ March	30	Married	None. Burst cyst
986	Dr. England, Winchester	„ March	58	Married	Intestinal and mesenteric. Cancer.
987	Dr. Priestley	„ March	53	Married	Pelvic
988	Dr. Péan, Paris	„ March	45	Married	Parietal and omental
989	Dr. MacSwiney, Dublin	„ April	35	Married	Parietal and omental
990	Mr. Harper, Holbeach	„ April	49	Married	None
991	Mr. Townshend	„ April		Single	Parietal and intestinal. Burst cyst
992	Mr. Pocklington, Wimbledon	„ May	61	Married	Parietal and omental
993	Dr. Garrett Anderson	„ May	63	Single	Omental
994	Mr. Frost, Williton	„ May	49	Married	Omental and intestinal
995	Mr. W. Adams	„ May	62	Widow	None
996	Mr. Bubb, Cheltenham	„ May	29	Single	Omental, intestinal, and pelvic
997	Dr. Stephens, Brighton	„ May	52	Married	Omental and intestinal
998	Mr. Clifton	„ May	35	Married	Parietal and omental
999	Dr. Whitehead, Manchester	„ June	46	Widow	Omental and pelvic
1000	Dr. Priestley	„ June	42	Married	Omental and cæcal

Treatment of Pedicle	Weight of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
Ligature . .	16 pounds	4 inches	Recovered	Well in 1881	969
Ligature . .	. . .	4 „	Recovered	Well in 1881	970
Ligature . .	25 „	6 „	Recovered	Well in 1881	971
Ligature . .	9 „	4 „	Recovered	Well in 1881	972
Ligature . .	15 „	5 „	Recovered	Well in 1881	973
Ligature . .	10 „	4 „	Recovered	Well in 1881	974
Ligature . .	17 „	5 „	Died, 5th day	Septicæmia	975
Ligature . .	22 „	5 „	Recovered	Well in 1881	976
Ligature. Both ovaries	. . .	5 „	Recovered	Died August 1880 of cancer of uterus	977
Ligature . .	24 „	5 „	Died, 5th day	Bronchitis	978
Ligature . .	7 lbs. ovarian ; 2 lbs. uterine fibroma.	5 „	Recovered	Well in 1881	979
Ligature . .	50 „	5 „	Recovered	Remains well 1881	980
Ligature . .	16 „	5 „	Recovered	Well in 1881	981
Ligature . .	22 „	5 „	Recovered	Well in 1881	982
Ligature . .	11 „	5 „	Recovered	Remains well	983
Ligature . .	6 „	5 „	Recovered	Well in 1881	984
Ligature . .	14 „	4 „	Recovered	Well and a child born 1881	985
Ligature . .	7 „	5 „	Died, 21 hours	Embolism	986
Ligature . .	5 „	5 „	Died, 24 hours	Embolism	987
No pedicle .	19 „	5 „	Recovered	Remains well in 1881	988
Ligature . .	21 „	5 „	Recovered	Remains well in 1881. Two miscarriages since operation ; now pregnant	989
Ligature . .	31 „	5 „	Recovered	Remains well in 1881	990
Ligature. Both ovaries	. . .	5 „	Died, 3rd day	Septicæmia	991
Ligature . .	40 „	5 „	Recovered	Remains well	992
Ligature . .	17 „	5 „	Recovered	Remains well in 1881	993
Ligature . .	15 „	5 „	Died, 19th day	Intestinal obstruction	994
Ligature . .	20 „	5 „	Recovered	Remains well in 1881	995
Ligature. Both ovaries	15 „	5 „	Recovered	Remains well in 1881	996
Ligature . .	20 „	5 „	Recovered	Remains well in 1881	997
Ligature . .	17 „	5 „	Recovered	Remains well in 1881	998
Ligature . .	12 „	5 „	Recovered	Remains well	999
Ligature . .	12 „	5 „	Recovered	Remains well in 1881	1000

CHAPTER XI.

ON OVARIOTOMY PERFORMED TWICE ON THE SAME PATIENT

THE first patient upon whom I performed ovariotomy, one ovary having been previously removed, had been operated on by Mr. Baker Brown six months before she consulted me on account of a recurrence of the disease. The paper in which I described this case was read before the Medical and Chirurgical Society in June 1863, and appears in the 'Transactions' for that year. The following paragraphs are quotations from that paper:—

'In November 1862 I was consulted by a married woman, forty-two years of age, from whom an ovarian tumour had been removed six months before by another surgeon. She left the institution in which ovariotomy was performed three weeks after the operation; but about a week after going home she became sick, and noticed an enlargement on the right side of the abdomen. She consulted Sir Charles Locock, who had seen her before the first operation, and who told her that another tumour was growing. Sir Charles saw her again in October, told her that the tumour was increasing, and advised her to wait about three months before having a second operation performed.

'When she came to me I was not aware that ovariotomy had ever been performed twice on the same patient. A case had been recorded in America where one surgeon had attempted to remove an ovarian tumour, but failed in his attempt, and another surgeon had afterwards succeeded. But I could find no case on record in which a patient had recovered after ovariotomy, and had afterwards undergone the operation a second time on account of disease of the remaining ovary. I was, therefore, very anxious to obtain the opinion of eminent men respecting this patient, and I believe that several who saw her

with me looked upon the case as unprecedented. But I have since learned that Dr. Atlee, of Philadelphia, has performed ovariotomy successfully upon a patient from whom Dr. Clay, of Manchester, had removed an ovarian tumour of the opposite side sixteen years before.

'When the patient first consulted me the tumour filled the greater part of the abdomen below the level of the umbilicus. On the right side it was elastic and obscurely fluctuating, while on the left side it was very hard. The uterus seemed to be closely connected with the hard tumour on the left side.

'I communicated with Sir Charles Locock upon all the important points of the case, and proposed to make an exploratory incision, and to be guided by the connection of the tumour as to further proceedings. Sir Charles approved of this suggestion, and added, "The operation affords the only hope of relief."

'Before proceeding to operate, I considered whether it would be better to make the incision through the linea alba—that is, within an inch of the cicatrix—or in one of the lineæ semilunares. But as there was some doubt whether the tumour was a growth from the right ovary, or a growth of some portion which had not been removed from the left side—in other words, whether the uterus was *pulled* or *pushed* to the right side—it appeared to be safer to cut in the meridian line than to run any risk of making the incision on the side opposite to the uterine attachment.

'I performed the operation on January 13, 1863. Mr. Clover administered chloroform, and I was ably assisted by Dr. Savage, Dr. Drage, of Hatfield, and Mr. Webb, of Welwyn. I made an incision over the linea alba, three quarters of an inch to the left of the cicatrix, and parallel with the lower four inches of it. On dividing the peritoneum, the tumour was seen to be composed of very thin-walled cysts, very tensely distended with clear fluid. These cysts, or rather divisions of a multilocular cyst, passed successively through the opening in the abdominal wall as Dr. Savage pressed the tumour from behind forwards. Several filmy layers of organised lymph and a layer of expanded omentum were pressed outwards before the cyst, and were divided on a director. A piece of omentum which adhered both to the cyst and to the abdominal wall near

the upper part of the incision was easily separated, and the tumour was then pressed out entire, without emptying any of the cysts. The pedicle was short, but it was easily secured by a clamp. It passed in the usual manner from the right side of the uterus. The uterus seemed to be of natural size. No remnant of the left ovary was found. After cutting away the tumour, there was some oozing of blood around the clamp, but it was stopped by tying a ligature tightly round the pedicle beneath the clamp. One bleeding vessel in the abdominal wall, and two in the omentum, were also tied. Just above the upper angle of the wound a long coil of small intestine adhered firmly to the abdominal wall. As the patient had complained of pain at this spot, and had suffered from constipation ever since the first operation, I examined the connection between the intestine and the abdominal wall to see if they could be separated safely; but the adhesions appeared to be so very close that I did not attempt to effect any separation. The wound was closed by deep and superficial silk sutures.

'The cyst is placed on the table of the Society. It is a good specimen of what is known as the compound proliferous cyst; and it is curious that the small groups of minute cysts not only grow into the cavity of the parent cyst, or project inwards, but also perforate the cyst-wall and project into the peritoneal cavity.

'The patient rallied remarkably well after the operation, and for forty-eight hours seemed to be recovering. Two small opiates were given on account of pain, but reaction was not excessive. The aspect was good; and the tongue, though white, was moist. The pulse was about 100. I removed the clamp forty-four hours after operation, as it seemed to be lying quite loose on the wound; the ligature which had been tied beneath it also came away with a shred of dead fibrous tissue. There was no bleeding. I also removed three of the sutures.

'On the 16th, the third day after operation, there was some flatulent distension of the abdomen, and frequent eructation, but no vomiting. The rectum was cleared by an enema. At 9 P.M., during one of the "fits of belching," as the nurse called them, the lower part of the wound gave way, and a knuckle of

intestine protruded. A good deal of fetid serum also escaped. I returned the intestine, reapplied three sutures deeply, and the patient did not seem to be worse.

'On the next day, the 17th, there was free fetid discharge from the lower part of the wound, and vomiting became troublesome; but the pulse was not more than 110, and the aspect was good.

'On the 18th, the pulse had risen to 120, but the tongue was moist and cleaning from the edges, and the colour of cheeks and lips very good. Still she was decidedly weaker, and the tympanites was increasing.

'She continued to become weaker all the next day, notwithstanding the free use of stimulants and nourishment both by the mouth and the rectum; and she died on the seventh day, or 154 hours after the operation.

'Decomposition of the body took place very rapidly. There was a good deal of fetid serum in the peritoneal cavity, and some traces of recent peritonitis were also shown by flakes of lymph. There was no blood or clot to be seen, and only one or two shreds of sloughy tissue at the spot where the tumour had been removed from the right side of the uterus. The peduncle of the tumour first removed connected the left side of the uterus closely with the abdominal wall. The adhering portion of intestine observed during my operation was so closely attached to the abdominal wall that it was difficult to separate it by dissection; and the greater part of the omentum also adhered to the abdominal wall.

'This case alone is sufficient to prove that ovariotomy may be performed twice on the same patient without any unusual difficulty. What the risk may be as compared with the risk of first operations can only be ascertained by a number of cases.

'Reflection upon this case would seem to suggest that, in performing the operation for the second time on the same patient, it may prove advisable to make the incision at some distance from the cicatrix left after the first operation; or, if the incision be made near the cicatrix, it may be necessary to leave the sutures longer than in ordinary cases, as the process of union may be slower near a cicatrix than in an uninjured part.

'The lessons suggested to those who perform ovariotomy under ordinary circumstances are—

'1. That the operator should be careful not only to remove every portion of an ovarian tumour on one side, if it be possible to do so, but also to examine the opposite ovary carefully, and to be guided in his practice by the knowledge that if the ovary be not healthy and be left behind, morbid growth will probably take place, and a second operation be required.

'2. That in uniting the wound in the abdominal wall the divided edges of peritoneum should be brought closely together in the manner which I was the first to propose in a paper presented to this Society five years ago.'

Then follow remarks, which are amplified in other chapters of this volume, supporting this conclusion. But it now seems clear to me that removal of the clamp and of the sutures too soon was the chief error in the after-treatment of this patient, and it is very probable that if they had been left longer undisturbed, the case would have ended in recovery.

The case which I am now about to condense from the fiftieth volume of the 'Medico-Chirurgical Transactions' is the first in which ovariotomy was twice successfully performed upon the same patient by the same surgeon.

'I performed the first operation in the Samaritan Hospital on February 15, 1865. The patient was an unmarried schoolmistress, aged twenty-four, who was admitted on December 29, 1864. She was feeble, and had a strumous appearance, with a hectic flush on each cheek. The whole abdomen was occupied by an irregular tumour, in some parts of which fluctuation was perceptible.

'The parents were healthy; but three of her sisters had died of phthisis. She herself had always enjoyed good health, and had menstruated regularly up to Christmas 1863. About that time her body began to enlarge without any known cause; pain in the *left* side became tolerably constant, and occasionally acute. By March 1864 the swelling was chiefly felt on the *right* side of the abdomen; it steadily increased in size and became fluctuant. In October 1864 and again in November of the same year, Dr. Robbs, of Grantham, tapped, and on each occasion drew off about twelve pints of clear viscid fluid. After

her admission to the hospital in December, a little swelling of the left leg was observed. On January 4, 1865, I tapped and removed seventeen pints of fluid. After the tapping, crural phlebitis in the left side increased, and the leg and thigh were much swollen and very painful. The heart and liver descended a little, and the general health improved; but the cyst refilled rapidly, and on January 30 I tapped again and removed eighteen pints of whitish glutinous fluid, similar to that before evacuated. After this tapping, groups of cysts, irregularly disposed, and evidently adhering in some places to the abdominal wall, were felt filling the whole of the hypogastric region, and on the right of the median line, above the umbilicus, extending nearly up to the sternum.

'Although the feeble state of the general health, the displacement of the thoracic viscera, and the family history, did not augur favourably for ovariotomy, it was so clearly the only resource that it was performed on February 15, after consultation with Dr. Routh. An incision was commenced one inch below the umbilicus, and carried downwards for five inches; there were extensive adhesions between the cyst and abdominal wall, above and to the right of the incision, extending to the brim of the pelvis, but they gave way to the hand. Having tapped and emptied a large cyst, and broken down a second within the first, the tumour was drawn out, and a piece of adhering omentum was separated. The pedicle was three to four inches in length, extending from the left side of a long thin uterus; it was secured in a small clamp, and left outside without traction. There was a little oozing from the separated adhesions. The blood was carefully sponged away, but no vessel required ligature. The right ovary was felt to be healthy. The wound was closed with five deep and three superficial sutures.

'The patient rallied well, complained of but little pain, and only required one opiate. The stitches were all removed on the third day—the clamp on the eighth day. The bowels acted for the first time on the thirteenth day, but there had been no uneasiness from the prolonged constipation. She left the hospital four weeks after the operation, and returned to the country in good health.

'About twenty-two pints of fluid were evacuated at the

operation, and the more solid remainder of the tumour weighed about seven pounds.

'The patient remained well for more than a year after the first operation. On February 14 last she wrote to me as follows: "A year having elapsed since my operation, I am thankful to tell you that I am quite strong again, and have never taken any medicine since I left the hospital. I am a wonder to myself when I consider how dangerously ill I was." I did not hear of her after this until she came to town and called on me, on August 6, when I found a semi-solid tumour of the right ovary, reaching up to the false ribs on the right side, in the centre to two inches above the umbilicus, and extending towards the left side half way between the umbilicus and anterior superior spine of the ilium. The uterus was freely movable. She said she had not noticed any increase in size for more than a month, but had felt pain in the right side in the spring. The catamenia had been regular till a month ago, but latterly had become scanty. At the periods in April and May dysmenorrhœal pain was excessive. There was some cough, but no very urgent symptom, and she returned to the country to consider my advice to submit again to ovariotomy before her general health became seriously impaired. About a fortnight later, on August 24, her sister wrote to tell me that the patient's cough had become very troublesome, and she was so much weaker, and generally so much worse, that if she continued to lose her strength she would not be able to go through the operation. As the Samaritan Hospital was closed for repairs, a room in the neighbourhood was procured, and the patient came to town on August 29. The tumour had grown very rapidly, dyspnœa and cough were very troublesome, temperature in axillæ 101° Fahr., and urine scanty. She had begun to perspire a great deal at night. The catamenia were expected in ten days. Careful examination of the chest failed to detect anything not explicable by the displacement upwards of the diaphragm by the ovarian tumour, which just reached the ensiform cartilage. As there was no cyst large enough to tap with any hope of affording even temporary relief, I performed ovariotomy the day after she arrived in town, August 30, 1866, just eighteen months and a half after the first operation. Professor White, of Buffalo, United States, and Dr. Hjort,

of Christiania, were present. I was assisted by Dr. Bowen and Dr. Wright, and Dr. Junker administered chloroform. Bearing in mind the slow and imperfect union in my former second operation, when I made the incision very near the cicatrix of the first operation, I made it in this case an inch and a half to the right of the cicatrix (which was exactly in the middle line), and carried it from one inch above the umbilical level downwards for five inches. Its lowest point was about half an inch higher than the level of the lowest point of the cicatrix. Three arteries, one of considerable size, were divided near the lower end of the incision, beneath the divided muscle, and were tied before the peritoneum was opened. A thin-walled compound cyst was closely adherent all over its anterior surface, but the adhesions yielded easily to my hand. I introduced a large trocar, but the cysts were too small and the contents too viscid for any fluid to escape. I accordingly opened the tumour, broke it up inside, pressed out a great deal of its viscid contents, and then withdrew the remainder, after separating a piece of adhering omentum. A broad thin pedicle extended about two inches from the right side of the uterus. The uterus was in its normal position; but the pedicle of the tumour removed at the first operation passed from the left side of the uterus and adhered firmly to the lower angle of the cicatrix in the middle line of the abdominal wall. The pedicle of the tumour about to be removed was enclosed in a broad clamp, and the tumour was cut away; three omental vessels were tied, and the ligatures cut off short. There was very little bleeding, but as some ovarian fluid had escaped, the peritoneal cavity was carefully sponged out. The pedicle on the left side interfered a little with this process, but it was continued until the sponges came quite clean from the lowest part of the space between the uterus and rectum. Finding that there would be considerable traction on the uterus and broad ligament if the clamp were kept outside, I determined to apply the actual cautery and burn off the portion of cyst left above the clamp, and be prepared to tie any vessel which might bleed on removing the clamp. Protecting the abdominal wall by two shields of talc—a most perfect non-conductor of heat—I used three or four hot irons, and as on separating the blades of the clamp there was no bleeding, the compressed and seared

pedicle was allowed to sink into the pelvis. The wound was closed by silk sutures. The fluid or jelly-like substance removed with the fragments of the broken-up tumour, together measured eighteen pints. The following description of the tumour is by Dr. Junker :—

'"The tumour consisted of an oblong mass, divided by delicate fibro-membranous septa into numerous chambers or loculi of various size. These septa, as well as the main wall, were exceedingly thin and friable ; so much so that the tumour broke up into fragments on very slight pressure. Some portions of the main wall and of the septa were very vascular, and covered with what appeared to the naked eye circumscribed round or oval red spots, having diameters varying from one to three lines. Under the microscope, however, these spots proved to be a dense capillary network, with well-defined abruptly terminating outlines. The interior of the loculi was in many places coated by a true tubercular deposit, often corresponding in size and situation to the red spots just described. In other places the tubercular exudation was more profuse, and some of the lesser loculi were entirely filled by yellow tubercular masses. Genuine tubercles, softening, or in a state of cretification (*Verkreidung*, of Rokitansky), were also found imbedded in the stroma. In some places the septa were softened or destroyed by the tubercles. The loculi were filled with a thin reddish or yellow, slightly ropy fluid, which in some of the chambers appeared more turbid from the presence of minute tubercles suspended in the fluid."

'The progress of the patient after the second operation was quite as satisfactory as after the first. There was rather more pain and sickness during the first thirty-six hours after operation, and three opiates were required during the first twelve hours. After the second day all unfavourable symptoms ceased, and she made a most satisfactory recovery, returning to Lincolnshire twenty-nine days after the operation.'

'*Note added November* 13, 1866.—I have heard from her twice since her return home. The last letter is dated November 10, 1866. She says, "I think upon the whole I feel as well as I did after my first operation. My voice is stronger. I can sing the upper notes with greater facility than formerly. I can sing from A up to C natural." I was curious to have the range

and power of the voice observed after the removal of both ovaries, and it could be done with unusual accuracy in this case, as the patient is a teacher of singing.'

In 1867 this patient went to reside at Brighton, and fulfilled her duties as a schoolmistress there for more than a year. I heard of her more than once as being in good health, but on June 30, 1868, I received a letter from Mr. Humphry, stating that she had died two days before, and adding, 'About a week before her death I saw her for the first time, when she had slight congestion at the bottom of one lung. In two or three days this subsided, but she seemed to get worse, great prostration, some sickness, small, quick pulse, restlessness of manner, and some fulness of abdomen leading me to fear some serious mischief about the seat of the old disease. These increased, with swelling of the left leg, which was painless, as was the abdomen; and she quickly sank. I found about a gallon of almost clear serum in the abdomen. No general adhesions. One pedicle adherent to lower end of scar in the abdominal wall, and adhesion between bowel and bladder. Uterus very small and elongated, from dragging to abdominal wall through pedicle. Clot in left iliac vein. No other sign of disease. I could only lay the attack to cold.'

In the next case where I performed ovariotomy successfully twice on the same patient, the first operation was performed in December 1861. It was my thirtieth case of ovariotomy, and I quote from the report published in 1865, specially directing attention to the examination of the opposite ovary, and the laying open of a cyst of the broad ligature at the time:—

'A. H., a cook, single, 50 years of age, was admitted on December 14, 1861, under my care, into the Samaritan Hospital, having been sent to me by Mr. Miles, of Gillingham. She has been tapped twelve times, the quantity increasing and the fluid becoming thicker every time. The last tapping was eight weeks ago, when thirty pints of fluid were removed in a private hospital where she was told that her case was too unfavourable for ovariotomy.

'Considering that a menstrual period had ceased a week before her admission, that her size rendered immediate relief necessary, that each tapping would lessen the probability of

success after ovariotomy, and that she was very anxious to have the operation performed, it was decided to operate without delay.

'The operation was performed on December 17, 1861; Dr. Parson administered chloroform. Dr. Marion Sims, of New York, Mr. Miles, jun., of Gillingham, and several other gentlemen were present. An incision was made five inches long over the linea alba, midway between the umbilicus and symphysis pubis, going through some of the cicatrices left by tappings. The principal cyst was so closely adherent here that careful dissection was necessary to separate it from the peritoneum, and the cyst was opened during the process and emptied. More extensive parietal adhesions were then separated by the hand, and some groups of smaller cysts emptied by breaking them down with one hand in the empty cyst, while the other hand was occupied in gradually withdrawing the mass of emptied and broken-down cysts. The pedicle was short, but was easily secured by a clamp about an inch from the right side of the uterus, and the tumour was then cut away. On examining the left ovary, it was found atrophied, but a thin-walled single cyst, as large as an orange, was observed close to the uterus, within the folds of the left broad ligament. This was laid open by an incision and emptied. The wound was then closed by silver sutures, carried through the whole thickness of the abdominal wall, including the peritoneum. The clamp had been left on, and it was secured with the stump of the pedicle at the lower angle of the wound. The cyst walls and groups of small cysts removed weighed between nine and ten pounds; and they had contained about thirty pints of fluid, so that the entire weight of the tumour was nearly forty pounds.

'The progress after the operation was most satisfactory. The patient had so little pain that not even a single dose of opium or of any other medicine was either given or required. The pulse never rose above 96, and was generally about 80. The clamp was removed on the fifth day, the slough then being quite dry and hard. The sutures were removed on the seventh day, when the wound was found to be firmly closed. The bowels acted on the ninth day, and on December 31 the patient was eating and sleeping well, and thoroughly convalescent. She left the hospital in good health, and afterwards worked well as cook in a large family.

'This case shows that even in late stages of ovarian disease, in a patient past middle-age, and after repeated tappings, ovariotomy may be performed with success. The chief peculiarity in this case was the small cyst found in the opposite broad ligament, after removal of one ovarian tumour. The cyst was so closely adherent to the uterus that it could not have been removed with safety; and as it is well known that thin-walled single cysts in this situation seldom refill after they have been emptied, I thought it not probable that, as it was freely laid open, it could lead to future trouble.' And for more than five years the result was very satisfactory. But in November 1867, Mr. Miles again wrote to me, stating that the patient upon whom I had operated six years before had lately returned from service with signs of a recurrence of the disease, having a cyst in the abdomen of about the size and shape of the womb at the sixth or seventh month of pregnancy. She was admitted into the Samaritan Hospital, November 15, 1867, giving her age as fifty-six. She said she had menstruated regularly up to the time of the first ovariotomy, and once a fortnight afterwards. It then ceased for a year; then she had a persistent discharge for a few weeks, and it then ceased altogether. She had felt perfectly well, and had acted as a cook until May 1867, when abdominal pain came on, followed by enlargement which gradually increased. The greater part of the abdomen was occupied by a fluctuating cyst, the abdomen being very hard and tender in the left iliac fossa. The cervix uteri, with its canal, was opened and dilated by a mucous polypus. This I drew down, and divided a small pedicle with scissors. The polypus was as large as a walnut. Bleeding was so free that it was necessary to plug the vagina. A fortnight afterwards, I tapped midway between the umbilicus and the right ilium, and drew off seven pints of viscid ovarian fluid. She was relieved by this, and went to the Convalescent Hospital December 13, 1867. She was readmitted January 25, 1868. The cyst was then well defined, extending on the left side from the iliac region to the false ribs, on the right side, about half-way from the umbilicus to the spine of the ilium, and above, half-way between the umbilicus and the sternum. The cervix uteri was high up, and there was some offensive discharge from the vagina. Injections were used daily. The vaginal dis-

charge ceased, and the cyst being fully as large or larger than before tapping, I performed the second ovariotomy on February 5, 1868. Chloromethyl was given by Dr. Junker. I made the incision parallel with the cicatrix over the linea alba, but an inch and a half to the left of it, and extending about an inch lower. Two vessels were tied before the peritoneum was opened. The cyst was exposed and tapped. The only adhesions were to a piece of omentum, which also adhered to the abdominal wall beneath the cicatrix and to a coil of intestine. These adhesions were easily separated. On withdrawing the empty cyst and a group of secondary cysts, the uterus was seen to be held up near the lower end of the cicatrix by the pedicle of the tumour removed in 1861. The cyst on the left side had a broad attachment behind and to the left of the uterus. There was not room to apply a cautery clamp without injury to the uterus, and I accordingly cut away the base of the cyst, tying all vessels which bled as I went on, separating the extremity of the Fallopian tube from the part of the cyst to which it adhered, and leaving a small portion of cyst wall closely adhering to the inner part of the tube and to the uterus. Very little blood was lost, but there were two ligatures on vessels in the abdominal wall, three on omental vessels, five or six on vessels in the cyst wall, and one on the separated end of the Fallopian tube and cyst.

The cyst weighed fifteen ounces and contained seven pints of fluid. It was a multilocular proliferous cyst with very vascular walls, the arteries being small, but numerous and tortuous, and many of the veins as large as a crow quill. She went on well, although nervous, feverish, and subject to palpitation, afterwards explained by the discovery that she had a large secret supply of brandy. Yet she left for Gillingham twenty-eight days after operation, on March 5, 1868. On March 16, Mr. Miles wrote, 'Her appetite is good, pulse quiet, no wound, no abdominal tenderness. It is a remarkably successful case.' Two months afterwards—May 22, 1868—he wrote: 'About three weeks ago I found that she insisted upon keeping her bed, although her tongue was clean, appetite good, pulse quiet and firm, and she had gained flesh. I thereupon, after very great obstinacy, got her to put on her clothes, and then in a few days to get downstairs and go out in a Bath chair, and she

bears it all well, though not with a good grace; but I wish to ask if you can account for the great craving for food which she has? She is most irritable if it is not brought the moment it is ordered by night and day. She makes a good deal of pale urine; sp. gr. 1015, contains no sugar.' In reply I alluded to the amount of brandy she drank without my knowledge whilst in the hospital. And I heard again from Mr. Miles that 'she died on October 6, 1868,' just eight months after the second operation. Mr. Miles did not make any post-mortem examination, and registered the cause of death as 'aberration of mind and voluntary abstinence from food.' He afterwards informed me that she became quite fleshy, and able to walk three or four miles, until she began obstinately to refuse all food.

In one other case I went prepared to perform ovariotomy upon a lady whose right ovary I had previously removed successfully; but I found the uterus and left ovary quite healthy, and a very thin-walled cyst attached only to the abdominal wall, as if it had arisen at a spot where some firm adhesions had been separated at the first operation. I emptied the cyst, laid it freely open, and saw the patient several years afterwards in good health.

I reprint from my volume of cases published in 1865, and entitled 'Diseases of the Ovaries,' p. 112, the account of the first operation in the next case, where it was performed twice on the same patient:—

'An unmarried lady, 28 years of age, was sent to me by Dr. West on June 7, 1862. With the exception of menorrhagia, which had always been troublesome, she had been well until the preceding summer. She then had some pain low down on the left side, but it went away, and recurred more violently in November 1861. Pain and sickness became frequently troublesome, and were increased at the periods. In January 1862 Dr. West was consulted, and detected ovarian disease. The size continued to increase; and, in March, Sir J. Paget removed six quarts of fluid by tapping, and injected iodine. Sickness and pain were severe for three days. She remained small for a month or six weeks, but had increased to about the same size as before the tapping. The girth was thirty-seven inches, length from sternum to pubes fifteen inches. The

whole abdomen was filled by a non-adherent cyst, which appeared to be unilocular, or nearly so, from the extreme regularity of the fluctuation in all directions. It was found afterwards that this was owing to the tension of small cysts with very thin cyst-walls. The pelvis was free, but the uterus was elevated, drawing up the vagina like a long funnel.

'I advised ovariotomy without delay, and performed the operation on June 11, 1862. Dr. Parson gave chloroform; Mr. Bateman, of Islington, Mr. Pierce, of Notting Hill, and Dr. Savage were present. On opening the peritoneum by an incision between four and five inches long, extending downwards from an inch below the umbilicus, some small tense cysts with very thin walls were seen, emptied, and withdrawn. Some adhesions near the site of the tapping were then separated, and the whole tumour brought out. I then found that the tumour was quite closely attached to the right side of the uterus; there was nothing like a pedicle. I accordingly passed the chain of an écraseur above the Fallopian tube and below the round ligament, and tightened it quite close to the uterus. I then cut away the tumour, and afterwards pared down the stump nearly to the tight chain. I then loosened the chain, intending to tie any vessels which bled, but there was no bleeding. So the chain was removed, the pelvis cleansed, the left ovary found to be healthy, two small pedunculated cysts of the left broad ligament twisted off, and the wound was closed by two deep and four superficial sutures of platinum wire.

'There was no sign of hæmorrhage after the operation, but more opium than usual was taken on account of pain. Sickness also was troublesome on the second day. There was a little oozing of blood from one of the stitches at night and next morning, but it ceased spontaneously. Early on the third day the catamenia appeared and continued freely. After this she improved. On the sixth day I removed the deep sutures. A little pus came from the track of each. Two days afterwards she was restless, and bilious vomiting recurred. I removed the superficial sutures, a drop or two of pus following each, and a small slough was caused by the lowest; but the wound was quite healed. For the next three days she was restless, and there was free oozing of pus from two of the suture points; but she went out of town on June 30, with the wound quite healed.

soon gained strength, was married in the summer of 1863, and a fine strong child was born in August 1864. Dr. King, of Camberwell, attended her, and informed me that the labour was perfectly natural.

'I used platinum sutures in this case, to ascertain if any advantage would arise from the use of a metal which would not oxidize like silver or iron, and remembering the use of platinum sutures twenty-five years ago by Mr Morgan at Guy's Hospital. But I have scarcely ever seen so much suppuration in the track of the sutures as in this case; and it taught me to look to the size of the needle, the size and smoothness of the thread or silk, the tightness with which it is tied, and the time it is left, as having more to do with suppuration or sloughing than the material of which the suture is composed.'

Continuing the history of this case after the marriage in 1863, and birth of the first child in 1864, I have to add that a second child was born in February 1866, and the patient again became pregnant early in 1867. Up till this time the health had been very good, but then disease reappeared, so that she required tapping during the pregnancy. Another tapping followed, and in May 1868 her medical attendant, Mr. Griffith, wrote that 'she had no bad symptom after the tapping. The vomiting has ceased, and with the diminished abdominal tension I can feel what appears to be almost a solid substance of considerable size on the left side, similar to but larger than what I felt after the last tapping.' Towards the latter end of May the distension again rapidly advanced, the measurement at the waist increasing at the rate of three inches in ten days; but the general health continued good. She was again tapped in June 1869, and the second operation, for removal of the second tumour, was undertaken on the 21st of the same month.

The incision was made parallel to, and half an inch to the left of, the cicatrix of the first operation, extending from the umbilicus to a point two inches above the pubes. A little ascitic fluid escaped on opening the peritoneum, and a coil of intestine was seen, as well as a large piece of omentum, which adhered to the abdominal wall around the umbilical ring. On introducing the hand, and pressing the intestine and omentum upward, I brought a tumour forward and tapped a very thin transparent cyst. Two or three pints of clear serum escaped,

and I then found a solid fibroid tumour to be closely attached to the upper and back part of the uterus. A coil of intestine and a piece of omentum which adhered to the tumour were separated from it, and the tumour was drawn outward. The chain of an écraseur was then passed behind the uterus around the neck of the tumour, avoiding the right ovary and right Fallopian tube, which were healthy. The chain was slowly tightened, and the tumour pared away near the chain. One omental vessel was tied, and the ligature returned with the omentum. Some stitches were then inserted to close the upper part of the wound, the chain of the écraseur being occasionally tightened. As it cut through there was free bleeding, and some vessels were tied on the posterior surface of the body of the uterus, and close to the left Fallopian tube, which had been divided.

When bleeding appeared to have ceased, the remaining sutures were applied and the peritoneal cavity carefully sponged. Some oozing of blood continuing, the uterus was again examined, and perchloride of iron was applied to part of the surface where there was some oozing. At length the wound was closed, the sutures being passed so as to include the opening at the umbilical ring, and two others beside the cicatrix, where there had been hernial protrusion.

The patient had been one hour and five minutes from beginning to inhale methylene until she was carried to bed. There was some sickness during the operation, and it continued afterwards, though during the first day there was no other bad symptom. She soon, however, began to show signs of failing power, and died sixty-six hours after the operation.

At the post-mortem examination five or six ounces of bloody serum were found in the peritoneal cavity, and some of the small intestines were slightly adherent from recent exudation of fibrine. The uterus and other parts were sent to Dr. Wilson Fox for examination, whose report runs as follows: 'The tumour is, I believe, a fibro-sarcoma, with a large proportion of cells like organic muscular fibres, but others are mere fibre cells. Besides these, there are a great number of round and oval-shaped nuclei. The tumour has under the microscope a minutely lobed character; *i.e.* it is traversed by septa in all directions, and in the septa the muscular fibres, and also the

fibre cells, are the most abundantly accumulated. The section is everywhere opaque, and glistening and firm; a few striæ of fatty degeneration are seen in spots only. Parts of the tumour are breaking up into a recticular structure, in the meshes of which a clear serous fluid is contained. Various cysts, from the capacity of a large walnut to that of a hazelnut, are also scattered through it, in addition to the larger ones opened before. As to whether this tumour represents a sarcoma of the ovary, I am not prepared to pronounce a positive opinion; but in some parts there are little cavities with well-defined walls, which look as if they might be the remains of the Graafian follicles, but the walls are completely changed by the fibroplastic growth, and their lining does not show any remaining distinct traces of the membrana granulosa. They appeared empty, and two or three times the size of the ordinary Graafian follicles. The amount of muscular tissue present is not, I think, enough to invalidate an ovarian origin. The general character of the tumour is unlike the fibroids of the uterus which I have seen, but I have not made these latter the objects of a sufficiently comprehensive study to be able to speak positively on this point. If the tumour is ovarian, as I am inclined to think, there would appear to be a double source of cyst formation in it—one, the liquefaction or breaking down into cavities, such as is seen in the whole class of these tumours; and the other, from enlarged and altered Graafian follicles.'

During the operation, besides the tumour, I found in the abdominal cavity a free, spheroidal body, measuring two inches in its long diameter, and an inch and a half in breadth, and three-quarters of an inch in thickness. Its weight was 241 grains. It was semi-elastic, of dark brownish-yellow colour, and the surface was smooth and shining. It consisted entirely of fat and cholesterine crystals, and had an exceedingly delicate investment of connective tissue, with fascicles of nucleated fusiform cells and elastic fibres. This body was evidently one of the appendices epiploicæ, which had separated from its pedicle, and had remained some time free in the abdominal cavity.

During the attendance with Dr. Griffith, in 1862, doubt arose, which my memory did not enable me to clear up, whether

I had been right in describing the *right* ovary as having been removed at the first operation; and the second operation not only justified the doubt, but also suggested the question—which even the examination of the tumour by Dr. W. Fox did not solve—whether the tumours in either operation were really ovarian, or fibro-cystic, or fibro-sarcomatous growths, originating in the uterus and only involving the ovaries. A case such as this, which, produced without a retouch from the note-book, not only shows the difficulties of diagnosis encountered in the emergencies of practice, but proves how perplexing, even in the deliberate investigations of the accomplished pathologist, some of the obscurer forms of disease may become, should tend to moderate any captiousness of criticism in matters of practical surgery, and open up the way to more minute and recondite research into the origin and forms of morbid changes.

To these four cases I have now to add nine others, making thirteen in which I have removed an ovarian tumour from a patient who had previously undergone the operation. In eleven of these patients I performed both the operations myself. It seems unnecessary to give a detailed report of the cases, but the facts are arranged in the table on next page.

Some writers on ovarian disease have asserted that the right ovary is much more frequently diseased than the left, and that coexisting disease of both ovaries is extremely rare. But, on examining the grounds for these assertions, we find that they are principally based upon examination of patients during life, or patients who have not been submitted to ovariotomy.

When we come to examine the result of post-mortem examinations we find (as a very little reflection would lead one to expect) that, as there is no anatomical or physiological reason why the right ovary should be more frequently affected than the left, so, in fact, one ovary is found to be diseased as often as the other.

Of 80 cases collected by Dr. West from Scanzoni, Lee, and his own notes of post-mortem examinations, in 28 the disease was on the right side, in 26 on the left side, and in 26 both ovaries were diseased—so that in about one-third of the cases both ovaries were diseased. In 1865 Scanzoni again drew attention to this subject in the Würzburg 'Medicinische

No.	Date of operations	Age	Condition	Adhesions—Side	Treatment of pedicle	Tumour	Incision	Result	History or cause of death	No.
							inches			
1	May 1862	41	M.	None—Right	Callipers	About 7 pounds	3	Recovered	Operation only lasted 5 minutes	1
	Jan. 1863	42	M.	Omental—Right	Clamp	Proliferous	4	Death, 7th day	Septicæmia	
2	Feb. 1865	24	S.	Omental—Left	Clamp	Multilocular	5	Recovered		2
	Aug. 1866	25	S.	Parietal and omental—Right	Cautery	Same, tubercular	6	Recovered	Died June 1868. Pneumonia	
3	Dec. 1861	50	S.	Parietal—Right	Clamp	40 pounds	5	Recovered	Cyst of broad ligament opened—Left side	3
	Feb. 1868	58	S.	Omental—Left	Vessels of P. ligature	Proliferous, 8 pounds	6½	Recovered	Died 8 months after. Insane, self-starved	
4	June 1862	28	S.	Parietal—Right	Écraseur	. . . . .	5	Recovered		4
	June 1869	35	M.	Omental, intestinal—Left	Écraseur	Fibro-sarcoma	5	Death, 66 hours	Doubtful if second tumour was uterine	
5	Feb. 1873	31	S.	Omental and parietal—Right	Clamp	11 pounds	4	Recovered		5
	June 1874	32	S.	Omental and parietal—Left	Clamp	Multilocular, 14½ pounds	4	Recovered	Died April 1876	
6	May 1870	27	S.	Omental and parietal—Left	Ligature	11 pounds	5	Recovered		6
	June 1875	32	S.	None—Right	Ligature and clamp	Multilocular, 9 pounds	5	Recovered	Married 1876. Well in 1881	
7	April 1873	20	S.	Parietal—Left	Clamp	20 pounds	4	Recovered		7
	July 1876	23	S.	Pelvic, intestinal—Right	3 Ligatures—no pedicle	5 pounds	4	Recovered	Well in 1881. Intestine torn	
8	May 1869	38	M.	No adhesions—Right	Cautery	13 pounds	4	Recovered	Well in 1881	8
	July 1876		M.	None—Left	Clamp	Multilocular, 8 pounds	4	Recovered		
9	Oct. 1872	37	M.	Slight parietal—Right	Clamp	Multilocular, 15 pounds	4	Recovered	Well in 1881	9
	Nov. 1876	41	M.	Intestine to abdominal wall—Left	Clamp	Multilocular, 20 pounds	5	Recovered		
10	Dec. 1865	35	M.	Parietal—Right	Clamp and ligature	40 pounds	5	Recovered	Well in 1881	10
	Dec. 1876	46	M.	None—Left	Clamp	Multilocular, 15 pounds	5	Recovered		
11	May 1870	53	W.	None—Left	Clamp	21 pounds	5	Recovered		11
	Feb. 1878		M.	Parietal—Right	Ligature	13 pounds	6	Recovered	Well in 1881	
12	May 1875	49	M.	Parietal and omental—Left	Clamp	. . . . .	5	Recovered		12
	June 1880	54	M.	Parietal slight—Right	Ligature	14 pounds	5	Recovered	Well in 1881	
13	Aug. 1876	46	M.	None	Clamp	7 pounds	6	Recovered		13
	Nov. 1881	50	M.	Parietal, omental, and uterine	Ligature	. . . .	5	Recovered	Well in December 1881	

With the exception of Case 1, when Mr. Baker Brown performed the first operation, and Case 9, when Mr. Cousins, of Southsea, did so, both the first and second operations were all performed by me.

Zeitschrift.' In a paper 'On the Relation of Disease of both Ovaries to the Ovariotomy Question,' he gives the result of an examination of the reports of post-mortem examinations for the previous fourteen years by his colleagues Virchow and Förster. These records were examined with the sole object of ascertaining in how many cases one or both ovaries were diseased—and in 99 cases of ovarian disease it was found that in 48 one, and in 51 both ovaries were diseased—so that in more than half the disease was on both sides. The tendency to disease of both ovaries appears to be greater before the age of fifty than in older women. Of 52 women under fifty, both ovaries were diseased in 31; one ovary only in 21 (59 per cent. to 40); of 44 women above fifty, both ovaries were diseased in 17 only, while one ovary was diseased in 27. Thus, under fifty, we had both ovaries diseased in 59 per cent.; above fifty, only in 38 per cent.

But it must be remembered that any conclusion drawn from post-mortem examinations would in all probability differ very widely from results observed in ovariotomy. The first series of facts shows what may be expected when ovarian disease has proceeded to its natural termination, or has only been modified by palliative treatment. The other series shows what may be expected when the patient is subjected to radical treatment before the disease has advanced to its last stages. All observation tends to the conclusion that disease begins in one ovary and advances to a considerable extent in that ovary before the other is affected, and that in about half of the cases it proceeds even to its fatal termination without any disease occurring in the opposite ovary.

If, then, in only about half of the cases where ovarian disease has reached its *latest* stage, disease of both ovaries is found, we might expect that in *earlier* stages of the disease both ovaries would be much less frequently affected; and so far as my observation has gone, this is the fact. In the 1,000 cases in which I performed ovariotomy I only removed both ovaries in 82 cases. In a few other cases the ovary not removed presented some indications of disease in a very early stage, but not sufficient to warrant its removal.

It is not improbable that in some of the earlier cases slight disease of the opposite ovary may have been overlooked; but,

making every reasonable allowance for such error, it is not probable that when ovariotomy is performed both ovaries will be found diseased in more than about 8 per cent. of the patients. Scanzoni thinks that as both ovaries have been so seldom removed (he finds only 25 on record), operators must either have overlooked disease of the second ovary or thought it insignificant, or believed that the removal would add too much to the danger. Of the 25 cases collected by Scanzoni 11 only recovered, and 14 died, a mortality of 56 per cent.; whereas, of 468 cases, where only one ovary was removed, the mortality was only 44 per cent. The results of my own experience may be seen in Chapter X. Of the 82 cases there recorded, 28 died and 54 recovered.

As to the frequency with which, after successful ovariotomy, the ovary not removed, but examined and found healthy, becomes diseased, four came under my notice up to the year 1872, and since 1872 there have been nine others, as may be seen at page 413, in the table of second operations.

In my second case, operated on in 1858, the patient remained well for seven years. Then disease of the opposite ovary appeared, so evidently of a malignant character that no operation was thought of, and soft cancer was found after death.

In the third case, also operated on in 1858, the patient died of peritoneal cancer ten months after operation, and disease had commenced in the remaining ovary, which was enlarged to the size of on apple.

In my forty-third case, operated on in 1862, disease of the opposite ovary came on two years afterwards, and was treated successfully by vaginal tapping and drainage. The patient remained well till 1872, when Dr. Sadler, of Barnsley, had again to give relief by vaginal tapping. She died in 1874.

CHAPTER XII.

ON THE TREATMENT OF PATIENTS AFTER OVARIOTOMY

The treatment of patients after ovariotomy may be considered under three distinct heads: first, the condition under which the patient is placed, and the duties of the nurse; secondly, the medical treatment; and thirdly, the surgical treatment.

A large, lofty, quiet, airy room, neither too hot nor too cold; two comfortable, small, clean iron bedsteads, with hair mattresses, and light, warm bedding, so that the patient may be lifted from one to the other, and have a fresh bed every day; the personal linen so contrived that it can be changed frequently without much disturbance of the patient; the windows provided with shutters or blinds disposed so as to admit only an agreeable amount of light, or to maintain a soothing twilight; an open fire, which, with an open window, secures a fitting temperature with natural ventilation; a floor free from all woollen covering and the removal of everything that could prove offensive or hurtful—these things together form a combination of favourable conditions which, important in general surgery and in the treatment of every case of severe illness, are even more imperatively necessary after ovariotomy. It is in attention to minute details, and in the observation of the ill-effects which follow the neglect of any of them, that the practitioner is taught their importance, and learns how much of his success depends upon careful and intelligent obedience in those who are entrusted with their performance.

The duties of the nurse are to use the catheter about every six hours, or oftener if the patient desires it, in order to render any movement or muscular effort in emptying the bladder unnecessary. This should always be done for at least three or four days; and it is often much longer before a patient is able to dispense with the use of the catheter. A silver catheter

seems to irritate the urethra and bladder less than an elastic instrument. Certainly, troublesome catarrh of the bladder is more frequently noticed when an elastic catheter has been used, probably because it is not so easily cleansed, and some decomposing mucus, or bacteria, are introduced by it into the bladder. A silver instrument is more easily cleansed. This should be carefully and thoroughly done every time the instrument is used, and it should be kept in carbolized water. The nurse should also be quite capable of injecting into the rectum, either small quantities of food, or such doses of some opiate as may be found necessary to relieve pain. A succession of small opiates, left to the discretion of an intelligent nurse, with directions to give only enough to keep the patient free from severe pain, answer better than larger doses administered at stated intervals under medical prescription. She should be ready to supply the patient either with warm or cold drinks, or with such light nourishment or stimulants as may be directed. Stimulants, such as brandy or champagne, must also be left to the nurse, but with explicit understanding that they are only to be used when called for by faintness, or chilliness, or some sign of exhaustion. Very little food is required during the first three days after the operation, but there should always be at hand a good supply of well-made barley-water, toast and water, thin gruel, water arrow-root, bread and milk, chicken broth or beef tea, or any other light nourishment which the patient may fancy. These she may be allowed to take almost as freely as she pleases, provided she is not sick. Should sickness be troublesome, a little brandy in iced soda-water, or champagne iced, will probably relieve it; but it is often only a sign of weakness, and is then best met by enemas of beef-tea, either with or without egg and brandy, thrown into the rectum, in quantities of not more than two ounces, at short intervals. Before giving the injection, and at any time when flatulence is distressing a patient, the nurse should introduce an elastic tube or the injection pipe some two or three inches into the rectum, in order that flatus may escape without straining effort, and also to allow of the outflow of any previously injected and unabsorbed food. The nurse should be able to note variations of the pulse, to take and record temperature observations with the thermometer, at stated hours, or on the occurrence of any

febrile symptoms; and in cases of drainage to attend to the cleanliness of the tube, and to draw off accumulations of fluid, or to inject antiseptic solutions, although a nurse who can be trusted to do this is an exceptionally good one. The nurse should watch the urine of the patient, and as soon as it becomes scanty or concentrated, depositing urates on cooling, she should be directed to give the patient every two or three hours some lithia water, or a mixture of the citrates of potash and lithia.

Beyond this administration of lithia and potash, and opiates in sufficient quantity to relieve pain, *medical treatment* may be said to consist in doing no harm, providing the case go on without any serious complication. But if peritonitis, either of the sthenic or traumatic character, or of the septic variety, occur, the fever accompanying either form of inflammation must be watched; and if the temperature of the body as shown by the thermometer rises considerably above the normal standard, means must be taken with the object of lowering the temperature. Packing the arms and legs in wet towels—even the cold bath—have been occasionally used in cases of hyperpyrexia, but generally iceing the head continuously is far less disturbing to the patient, and even more efficacious. I have tried the cushions made of tubes for iced water, introduced by Dr. Roberts, of Manchester, and icebags for the neck, after Dr. Richardson—but prefer Mr. Thornton's ice-cap for the head to any other arrangement. Before antiseptics the head was kept cool for a day or two in about half the cases. Since antiseptics I have scarcely ever found it necessary.

The bowels are kept quiet after the operation; and as long as the patient feels comfortable, their action need not be brought on, even if they do not act for ten days or more. I have known them nineteen days without acting, and then act naturally without any painful effort. An enema of warm water or a dose of castor oil will bring on their action if not spontaneous. Accumulation of hard fæcal masses in the rectum may cause tenesmus, keep up a spurious diarrhœa, and thus render the patient uncomfortable. Their presence will be discovered by digital examination. They should be broken up with the finger or a spoon, and the bowels afterwards cleared by injecting warm water. If the first motion fatigues the patient and

renders her restless, it will be advisable to have it followed by an opiate enema. Vomiting is often a troublesome symptom, less so when methylene has been used than after chloroform. It is sometimes relieved by giving small pieces of ice to suck, or to swallow as ice pills; sometimes by draughts of hot water. Of all medicines, I have found 15 grain doses of bromide of potassium in two ounces of water the most useful. Next to that, three to five drops of prussic acid; but this is sometimes dangerous by leading to accumulations of large quantities of fluid in the stomach. If this accumulation and consequent faintness are observed, it may be necessary to empty the stomach by the stomach-pump.

Flatulence, often a very troublesome symptom, may be relieved by passing the elastic tube of an enema apparatus up the rectum. An enema of five grains of quinine in an ounce of water, with or without a few drops of laudanum, repeated every four hours, has often relieved flatulence by restoring the tone of the muscular coat of the intestines, and occasionally Faradisation has proved useful in the same way. A few drops of chloric ether and salvolatile sometimes give relief, and tincture of nux vomica has appeared to be of use in some cases.

Surgical treatment.—The various conditions following ovariotomy which may call for surgical treatment may be arranged in order, commencing with the wound in the abdominal wall and the separation of the pedicle; collections of serum, blood, or pus in some part of the peritoneal cavity; adhesions between the intestine and the pedicle, or the abdominal wall, leading to intestinal obstruction.

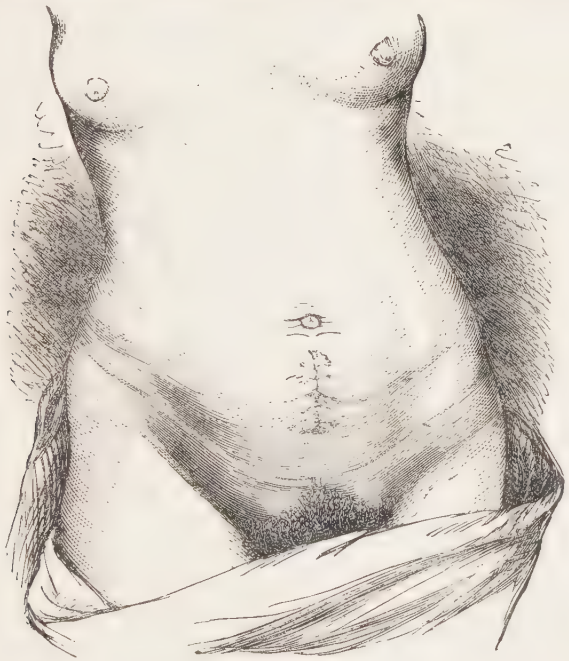
Unless the abdominal wall is œdematous, or the dressing is moistened, it is better not to disturb the bandage or plaster until the seventh day after operation. And then it is not necessary to raise the plaster from the sides of the abdomen: it should be raised and divided with scissors two or three inches on one side of the wound, then raised and divided on the other side. In this way the wound may be uncovered without disturbing the patient. After removing the gauze, the plaster left on either side is used as splints, and drawn together by new plaster above and below the wound so as to take off all tension from the wound as the stitches are removed. As a rule, union takes place without any suppuration, but occasionally a little

pus will exude from one or more of the points of suture. This may cause a little feverishness, but is not of much consequence. Indeed, since antiseptics it is very rare to see even a single drop of pus. Three or four times, before the antiseptic period, I have seen considerable collections of pus in the abdominal wall, almost always in very fat patients. In such cases care must be taken to avoid any dressing which would interfere with the free escape of the pus. A pad of boracic cotton should be placed over the wound, and support given by strips of plaster, which draw up the side pieces or splints. Kœberlé uses cotton threads steeped in collodion with the same object.

In every case after removal of the sutures, the abdomen should be supported by adhesive plaster for at least a fortnight, or until the wound is firmly agglutinated. Tympanites, hiccup, and vomiting might separate the edges of a wound which had united fairly well, if these edges were not well supported. In a few cases I have seen more or less reopening of the wound; in two the sutures were removed too early, and the abdominal walls were not supported by plaster; in other two cases there was pyæmia or septicæmia, and the plastic process was slow on account of the state of the blood; in other two cases the accident was caused by violent cough on the seventh or eighth day, a day or two after the stitches had been removed. These two patients recovered, the others died. I have also seen other cases where partial reopening of the wound has appeared to do good by admitting of the escape of serum. In all, the stitches were replaced as soon as I was aware of the occurrence.

Unless the pedicle is very short, if a clamp has been used it lies across the lower part of the wound, without any depression of the abdominal wall, and the patient is quite unconscious of its presence. Sometimes, with a very short pedicle, the clamp and the integuments have been drawn almost down to the sacrum, even then, without much complaint from the patient. There has sometimes been protrusion of the pedicle behind the clamp, separating the lower edges of the wound. When this occurs, the lowest stitch should be removed, as the protrusion is due to obstructed return of blood through the veins of the pedicle. Two or three times the protrusion has been so great that I have passed a pin through the pedicle behind the clamp, tied a ligature below the pin, and cut away both clamp and

pedicle; but this was seldom necessary, as the swelling subsides soon after the removal of the compression caused by the too tight stitch. The clamp and the portion of pedicle compressed by it generally fell off from the seventh to the tenth day, sometimes as early as three or four days, and sometimes not for fifteen or more. It is important not to remove the clamp too soon, especially if the pedicle is short, as the newly formed adhesions between the pedicle and the abdominal wall might give way, and the pedicle sink into the peritoneal cavity, possibly giving rise to septic peritonitis and death, and probably leaving an opening which, after healing of the skin, would admit of the easy production of a ventral hernia. But when the clamp is only held by a few shreds of dead tissue, it may be removed. A little ulceration of integument from pressure of the clamp should not lead to the premature removal of the clamp, as this is of far less consequence than the risk of removing the clamp



too soon. This woodcut, copied from a photograph taken by Dr. Wright, shows the ordinary appearance of the abdomen with the cicatrix in a young person three weeks after operation.

Where a clamp has not been used, but the patient has been treated by one or other of the intra-peritoneal methods, union by the first intention along the whole length of the incision is usually complete. The delay in the union at the lower angle of the wound, where the remains of the pedicle are fixed, may protract the complete cicatrization to the third or fourth week, but this is of little consequence, and need not interfere with the movement of the patient.

When bad symptoms follow ovariotomy—pain, vomiting, fever with abdominal distension—the surgeon should suspect that some fluid, either serum, blood, or pus, is collecting in the peritoneal cavity. It may collect in such quantity as to give rise to sensible fluctuation from one side of the abdomen to the other; or it may gravitate to the bottom of Douglas's space, and form a tense swelling behind the uterus, easily felt through the vagina, although there may be no free fluid perceptible in the abdominal cavity. If the pedicle has been treated by ligature, the ends of the ligature passing outwards then serve as drainage conductors, and a very free discharge of fluid may go on for several days. Kœberlé prepares for drainage by introducing strong perforated glass tubes, and, by the aid of a syringe fitted to the tubes, he withdraws fluid several times daily. Peaslee has advocated and adopted with success this system of drainage, with the addition of repeated washings out of the peritoneum with warm water and disinfecting solutions. In a few bad cases I have also followed this practice, but never with success.

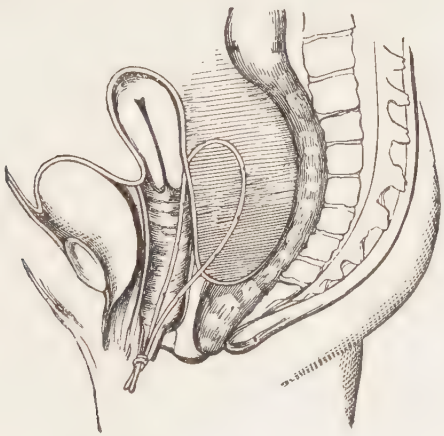
In most of the cases reported by Peaslee as treated with peritoneal injections, the pedicle was dealt with after the oldest method: that is, it was transfixed, each half was tied, and the ends of the ligatures were allowed to hang out of the wound. In one, the ligatures were brought out through a vaginal canula. In all, the convalescence was very tedious, and three had septicæmia. The most remarkable of the whole, as regards the treatment, was that in which one hundred and thirty injections were made into the peritoneal cavity in seventy-eight days. The last ligature came away, and pus ceased to be secreted, on the ninety-fourth day after operation.

Whenever fluid can be detected by vaginal examination in the neighbourhood of the uterus it is usually in such quan-

tity that it must be removed; and this is done either by Scanzoni's trocar, the straight instrument, with triangular canula, here shown, or by a curved trocar, over which an elastic catheter is fixed, instead of a canula; or by a trocar still more

curved a piece of drainage tube may be inserted and fastened, as shown in the next cut. I introduced this tube in the following case, where it led to free discharge, which was followed by complete recovery.

An unmarried girl, eighteen years of age, was sent to me by Dr. Whitehead, of Manchester, as a favourable case for ovariotomy, and was admitted to the Samaritan Hospital on



June 5, 1864. The disease dated from the commencement of the catamenia, five years before, and six months after a leg had been broken. Increase had been rapid at first, but latterly slow. She had not been tapped. A point of great interest in diagnosis was observed in this case: the tumour was observed to move very freely beneath the abdominal parietes on deep inspiration, and I therefore expected to find a non-adherent tumour; but at the operation very firm adhesions had to be

separated. They were, however, sufficiently long to admit of the cyst moving freely. Ovariotomy was performed on June 13. Dr. Parson gave chloroform. On making an incision four inches long midway between the umbilicus and symphysis pubis, three small cysts filled with gritty matter were exposed in the cellular tissue between the sheath of the recti and the peritoneum. These were dissected out. Long and very firm adhesions anteriorly and in the right iliac fossa, and a very extensive surface of adherent omentum, were separated by the hand with some difficulty, and a close adhesion to the fundus of the bladder was separated by very careful dissection. Eleven pints of fluid were removed by the trocar. The ovary appeared normal, while the tumour was attached to its external angle by a narrow pedicle, about one inch in length. The ovary was, however, removed with the tumour. A small pedicle was secured close to the uterus by a silk ligature, which was cut off short and returned. There was very little bleeding, and the wound was closed in the usual manner. The stitches were removed forty-four hours after operation, the wound being perfectly united. On the third day after operation some sharp pain came on, which became easier after a uterine discharge like menstruation appeared. She continued doing well till the 22nd (ninth day), when, after a sleepless night from pain and flatulence, she was found in a state resembling typhus fever—dry tongue, dilated pupils, flushed face, and drowsiness. As this condition became more decided in the afternoon, I examined by the vagina and rectum, and, detecting fluid between them, made a puncture by a trocar, and let out five ounces of dark bloody serum which had a putrid ammoniacal odour. This was followed by some relief. The pulse sank from 112 to 95 and 92, but mucous diarrhœa came on, and the typhoid condition was aggravated next day. As the discharge from the trocar puncture had ceased, and examination detected fluid still in the recto-vaginal space, I made another opening into it, and evacuated ten ounces of fluid still more putrid than that of the day before, and containing pus. I then carried on the trocar through the opening made the day before, and drew a drainage tube through the canula before withdrawing it. The tube was then tied and left fixed, as shown in the diagram. I took great care that it should pass through the lowest point

where the peritoneum is reflected from the rectum to the vagina. Very free discharge came through the tube for several days, and the general condition rapidly improved. The tongue and mouth were covered with aphthous spots for several days, and diarrhœa was troublesome. But the tube was removed on July 1, and convalescence was rapid. She was sitting up on the 6th, and was to leave for the country on the 14th. She went to the Seaside Convalescent Home at Eastbourne, remained there a month, and returned in perfect health.

The result of my experience is, that the danger of puncture has been very greatly exaggerated; that the benefit of the evacuation of fluid is often very marked; and that any danger arises from too early closing of the opening, not from the opening having been made. Where it is not easy to pass a drainage tube, or where it is desired to use antiseptic injections as well as drain, it is better to leave a silver canula in Douglas's pouch, and to keep it there by the spring of double silver wire as shown in the drawing at page 169. It passes out through the vagina, and injections may easily be thrown through it. But this is one of the troublesome details of after-treatment which has become extremely rare since the adoption of antiseptics.

The most alarming symptoms which occur after ovariotomy are those which depend upon obstructed intestine. I heard of one case which has never been recorded, where a loop of intestine slipped through one of the loops of wire used as sutures for the wound, and was tightly compressed when the wire was fastened. In a published case, there is very little doubt that a fæcal fistula was caused by perforation of intestine with the stitch closing the wound. In one of my early cases, a coil of intestine was compressed between the pedicle and the abdominal wall, and I have seen others since, where the same accident would have happened if I had not been on my guard. After the intra-peritoneal methods of dealing with the pedicle by ligature and by cautery, I have seen fatal obstruction of the intestine caused by adhesion of coils of intestine around the divided end of the pedicle at such sharp angles that the canal was quite closed; and I have seen adhesion of intestine to a pedicle secured by the clamp lead in the same way to obstruction. The following case illustrates the course of the symptoms when this dangerous complication presents itself:—

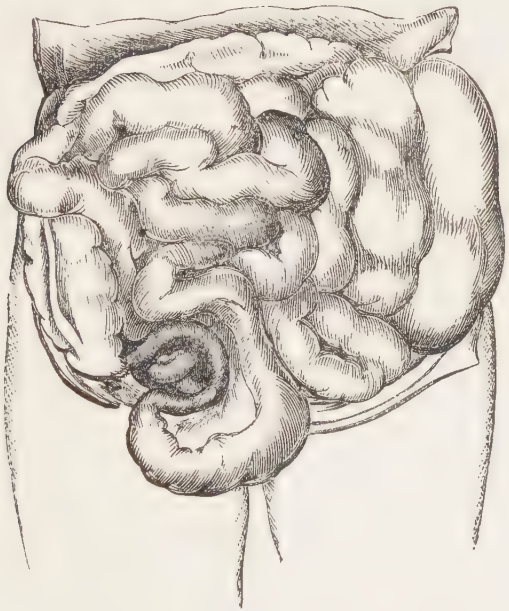
A single woman, thirty-five years old, was sent to me by Dr. Giles, of Oxford, and was admitted to hospital in March 1867. The whole abdomen was filled by a multilocular ovarian cyst. The uterus was healthy, and its mobility free. Ovariotomy was performed on March 27. A pedicle, two to three inches broad at its narrowest part, and about one-third of an inch thick, connected the base of the tumour closely to the right side of a small hard uterus, of irregular shape from a fibroid nodular outgrowth. A cautery clamp was applied, and the pedicle separated by hot irons. On opening the clamp, the compressed and seared pedicle appeared at first quite secure. But as the pedicle was slowly separating from the blade of the clamp to which it adhered, three vessels bled freely. These were tied, and then, as there was some oozing of blood all along the line of eschar, I transfixed the pedicle close to the uterus, tied the pedicle in two halves, and allowed it to sink into the abdomen, after cutting off the ends of the ligature short. Scarcely any sponging was necessary, as no ovarian fluid had entered the peritoneal cavity. The left ovary was healthy. Eighteen pints of colloid fluid were removed, and the more solid portion of the tumour weighed five pounds.

On examining the root of the tumour after removal, seven or eight arteries as large as a crowquill were observed entering the tumour and forming numerous corkscrew-like ramifications. Dr. Junker found a number of yellow tubercles imbedded in the stroma of the tumour—both in the periphery and near the base—separate, as minute yellow and greyish-yellow spots; and confluent, of the consistence of cheese.

The state of the patient after operation was unsatisfactory from the first, but there was not much pain. Some sickness on the day after operation increased on the second day, and the abdomen became tympanitic. On the third and fourth days the vomiting continued, a great deal of dark green or coffee-coloured fluid being thrown up. A free fluid motion was followed on the fifth and sixth days by some improvement, although the vomiting of large quantities of greenish fluid continued. On the seventh morning the patient appeared much better; but in the evening the pulse was 160, and she appeared almost moribund. Five grains of quinine were given

every three hours by mouth and rectum. In sixteen hours thirty-five grains had been given, and on the eighth day the pulse had fallen to 120. In the next ten days she improved in many respects. There was no vomiting, but she suffered at times with abdominal pain and much flatulence. On the nineteenth day she appeared remarkably well; but at night, after a free watery motion, she suddenly became faint and sick, and died on the morning of the twentieth day.

The wound was found firmly united. There were scarcely any traces of general peritonitis. No intestine was adherent



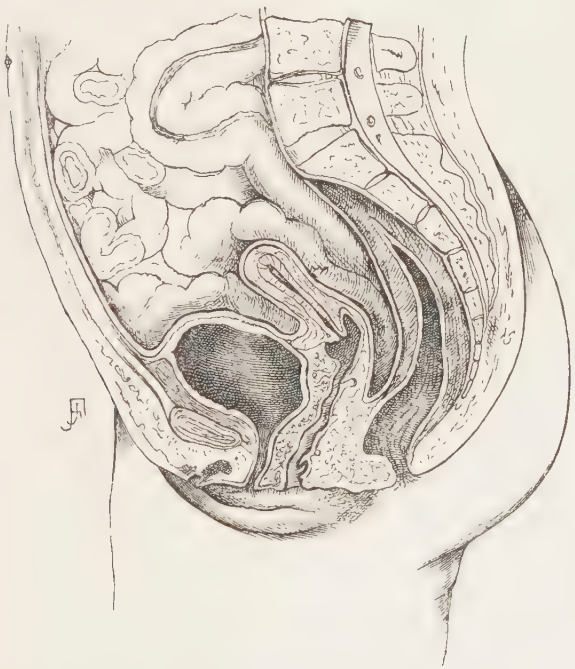
near the wound, but one coil slightly adhered above the umbilicus. The uterus was small, and had a fibroid nodule the size of a marble projecting from its fundus. The left ovary was healthy. The pedicle of the tumour of the right ovary was closely surrounded—as shown in the accompanying engraving, copied from a drawing made by Dr. Junker—by an adhering coil of the ileum just before it enters the cæcum. About an ounce of pus was circumscribed by this adhering intestine around the end of the pedicle, so that none of the

pus entered the peritoneal cavity. The canal of the adhering coil of intestine was almost completely obstructed, partly by the sharp curves at which it was fixed, and partly by the contraction of the adhering portion, the intestine above being much distended. There was neither blood, lymph, nor serum in the peritoneal cavity, nor could any tubercular deposit be found.

An interesting case, which I had seen with Dr. Bantock at the Samaritan Hospital, is reported by Mr. Doran in the 'Transactions of the Pathological Society for 1879,' vol. xxx. The obstruction in the intestine was followed by perforation and death. Some weeks before her admission into the hospital, the patient had been ill with fever followed by symptoms of peritonitis, and during the operation for removal of a suppurating ovarian cyst Dr. Bantock found that the hinder part of the tumour was closely adherent to eight or ten inches of the lower portion of the ileum. The adhesions were broken down with sponges and six small open vessels were secured by ligature. At the end of two days the temperature rose and there were signs of intestinal mischief. On the eighth day the woman died in a state of collapse. The post-mortem showed a coil of ileum partly adherent to the abdominal wall, which as soon as it was raised gave issue to fluid fæces through a perforation of its coat posteriorly, as it had already done to the extent of a pint during life. Above this point, the small intestine was filled with flatus and fæces; below it, the remainder of the ileum, as far as to within three inches of the ileo-cœcal valve, was matted together by recent lymph on the serous coat—the site of the former adhesion to the back of the cyst. This obstructed mass, much narrowed and quite empty, hung down over the promontory of the sacrum. The end of the ulcerated coil, being full of flatus, had risen so that its free border almost touched the mesentery above. Hence the intestine was sharply twisted at the point where this coil joined the dependent obstructed mass. This complication, evidently secondary, made the obstruction complete. The perforating ulcer was nearly a foot above the twist in the ileum, with clean-cut edges, but thickened. The muscular coat was exposed and also perforated, and in the serous coat there was a hole one eighth of an inch in diameter. Perforation was commencing in several neighbouring ulcers, but there was no

trace of ulceration in Peyer's patches. A preparation of the parts, made by Mr. Doran, is now in the pathological series of the museum of the College of Surgeons (No. 1,201 B).

In all these cases the symptoms are exactly those of strangulated hernia. They may be relieved by opium or belladonna, but are almost certainly fatal if the obstruction cannot be overcome. More than once I have reopened the abdomen and separated adhering intestine from the pedicle, with temporary relief, but new adhesions followed and ultimately death. I have seen several cases where symptoms of obstruction have



gradually disappeared, and this has led me to wait too long in other cases before reopening the wound and searching for the seat of obstruction. In one case I might easily have saved life by separating a mere film of adhesion close to the wound, which held a piece of small intestine as sharply as a ligature. The preparation is in the Museum of the College of Surgeons.

These two woodcuts serve to make clear a point in anatomy

which, from being overlooked or forgotten, has often led to difficulties in diagnosis and sometimes to dangerous proposals, or mischievous practice. It will be seen by the representation of the perpendicular section of the abdomen, pelvis, and their contents, how under certain circumstances Douglas's pouch may become distended by fluid or by a mass of intestines gravitating into it. To be able to make sure of the nature of the tumefaction thus caused, and perceived during vaginal examination, requires tact and experience, and I have not been surprised sometimes to hear most erroneous speculations about it and to find myself consulted as to operative measures for its relief, under what was

supposed to be the most urgent necessity. But a study of the relations of the parts will show how the presence of small intestines filled with fæcal matter and falling low down into Douglas's pouch between the uterus and rectum may simulate abscess or hæmatocele. The drawing also explains what a scope, when the expansion of the pouch has once begun, the space offers for the enlargement of a cystic tumour in that direction, and how by remaining for some time undisturbed it may so model itself to the form of the pelvis and to the outline of the organs in it, as to be raised with difficulty and to give cause to fear the presence of serious attachments. All this explains one

cause of obstructed intestine which has hitherto escaped notice. Adhesion of coils of intestine to the pedicle, to the abdominal wall, or to neighbouring coils of intestine at such sharp curves or angles as to close the canal have been referred to; but the fact that this adhesion may take place low down in the pelvis at the bottom of the recto-uterine pouch has not been mentioned. Still, it is not very rare, and, though easily recognized when understood, it may easily be mistaken for abscess or hæmatocele. The first of these two drawings shows how in most adults some portion of the small intestines sinks down in the normal condition of parts between the uterus and the rectum. After ovariotomy, especially when the lower part of the ovarian tumour has pushed the uterus upwards and forwards, a considerable space is often left between the rectum and uterus, and into this the small intestines fall down. I have very often found them there when sponging out the pelvis. Now, supposing them to be more or less firmly fixed there by effused lymph, it is very probable that some obstruction may follow, and that a considerable swelling may be discovered behind the uterus on examining by the vagina. Rectal examination at once shows that it is between the rectum and the uterus, and probably that it is more towards the right than the left side. A glance at the second of these woodcuts shows why this is so. The rectum, containing fæces, fluid, or gas, occupies the left side before it reaches the middle line, and there is more vacant space towards the right of Douglas's pouch to admit the small intestines. There they may adhere and form a considerable tumour.

Sometimes, long after recovery, more or less complete obstruction of intestine is followed by the formation of a fæcal fistula. Such cases are recorded by Dr. Lyon, of Glasgow, Dr. Keith, of Edinburgh, and Mr. Bryant. Once the same thing happened in a patient of my own. In Dr. Lyon's case the operation was performed in February 1866, 'easily and favourably.' Hiccup and severe vomiting were present for a few days, and it was afterwards found that union of the edges of the wound was imperfect. A portion of intestine was to be seen adherent at the bottom of the wound. Pin-like perforations took place in this, and gave issue to fæcal matter and offensive gas. Various means were taken to obtain healing, but in August

1867 the wound, or rather the small exposed portion of perforated intestine, remained unchanged.

Dr. Keith operated on a patient, aged thirty-two, in October 1865. Both ovaries were removed, the pedicle of the second being so short that it was tied with silk ligatures, the ends cut off short. The patient recovered rapidly, and at the end of six weeks was quite well. She then began to have pain and irritation in the pelvis, and in December pelvic abscess formed and pointed a little above Poupart's ligament. By January 1867 the opening was almost closed, but the following May there was a sudden escape of coagulated blood from the rectum, followed by a free discharge of pus from the opening in the groin. Fæcal matter soon made its appearance, and continued to flow till July, when the fistula finally closed. This is the only case of the kind which has fallen to Dr. Keith, and it was also the only one in which at the time he published the case he had returned the pedicle with the ligatures into the abdomen after ovariotomy.

Mr. Bryant's was a case of successful ovariotomy in 1867. The pedicle was transfixed and tied with whipcord; the ends of the ligature being cut off, they were allowed to sink into the abdomen with the pedicle. These ligatures were discharged some months afterwards through an artificial anus at the lower part of the abdominal wound, which in the end healed up completely.

The operation in my case was performed on March 10, 1864. The patient was fifty-seven years of age. She had been tapped three times, and had suffered from several attacks of circumscribed peritonitis. A large multilocular cyst of the left ovary was removed. It had so displaced the uterus that the pedicle seemed to be on the right side, but it afterwards appeared that the right ovary was healthy. The pedicle was transfixed, each half tied separately, the whole surrounded by a third ligature; and the tied end, after separation of the tumour, was returned into the abdomen with the ligatures, the ends of which were cut off short, close to the knots. A portion of the cyst adhered so firmly in the left iliac fossa that it could not be separated, and it was left adherent, after transfixing and tying it, leaving the ends of the ligature hanging out of the lower angle of the wound. The patient recovered, and

went to Leeds, five weeks after the operation, the ligatures still keeping the lower part of the wound open, and a little discharge daily escaping beside them. She bore the journey well, and improved till May 6, when, after fatigue, she had a severe rigor, followed by vomiting and bilious diarrhœa. Fever and profuse perspiration followed, and the discharge became more abundant along the track of the ligature. On May 10, 1864, the late Mr. Teale, of Leeds, wrote: 'Yesterday evening the discharge was evidently feculent, and continues so to-day.' On the 11th he wrote: 'The discharge is now simply purulent, without any stain of fæcal matter. The ligature has yielded considerably this morning, but is not quite at liberty.' On May 31, the ligature came away, the discharge gradually lessened, and the patient considered herself to be well. She came to London in October; and, although there was a very slight oozing of pus from the lowest part of the cicatrix, she appeared to be perfectly well. She remained well during the winter and early spring, but in May 1865 Mr. Teale wrote to tell me that for some weeks past there had been 'at intervals a considerable increase of discharge from the sinus, attended with uneasiness, but not with severe pain. The odour of the discharge is offensive—not putrid, but faint or albuminous. I do not think there is any lodgment of matter. It seems to escape freely as it is secreted. Deep in the left iliac region is a general state of solidity of the parts, as contrasted with the opposite side.'

It should be remembered that although the ligature which had been left hanging out through the wound in the abdominal wall had come away in May 1864, there was no proof that the ligatures tied on the pedicle after transfixion, and cut off short, had come away. Mr. Teale thought they might be present, and keeping up irritation. He adds, 'To-day I examined the sinus with an elastic catheter, and at the depth of $4\frac{1}{2}$ inches encountered a solid resistance. Having introduced a hollow elastic tube open at the end, I passed through it a fine wire stilet, hooked at the end, and tried to angle for the retained ligatures, but without success. These proceedings were conducted in the most gentle manner, and did not cause the least distress.' On May 25, Mr. Teale again wrote: 'She has been slightly feverish and frequently troubled with diarrhœa, and I

have not thought it right to attempt any mechanical treatment. The discharge is less in quantity, but I think it has shown a little fæcal tinge.'

After this the discharge became more abundant and more decidedly fæcal, varying in quantity from day to day. She often complained of a feeling of painful distension at the lower part of the abdomen. This was generally followed by a gush of acrid irritating discharge, and then by relief. The amount of fæcal matter in the discharge varied considerably. If the bowels were not relaxed, there was little or none. Latterly, however, as she became confined to bed, she had frequent attacks of diarrhœa, and then fluid fæces escaped in considerable quantity from the fistula. But no solid fæces ever passed. She gradually became weaker, and died December 20, 1865, about twenty months after ovariotomy.

I am indebted to Mr. T. P. Teale for a report of the post-mortem examination. 'The fistulous opening on the surface of the abdomen was large enough to admit the tip of the little finger. Within the abdomen it was so dilated as to admit a middle finger at least. On opening the abdomen we found the edge of the omentum adherent to the wall at the level of the wound—a coil of small intestines sealing the wound above the fistula, which latter was at the lower extremity of the wound. The omentum and sub-peritoneal tissues were excessively loaded with adipose tissue. A small part of the small intestine, the sigmoid flexure, and the rectum were matted together around the fistula and the left corner of the uterus. Close to the left side of the uterus was a mass, almost spongy and pedunculated, which projected towards the rectum. In the centre of the mass was a large suppurating cavity which communicated with the fistula and with the rectum, by two large openings. The cavity extended for some distance between the uterus and the rectum. It passed towards the right side behind the lower part of the uterus; downwards by the side of the rectum; and forwards as far as the femoral ring. No trace of any ligature could be found. The right ovary was healthy. The liver was greatly enlarged and much altered by fatty degeneration.'

This case, and others, as I have before stated, influenced me in favour of the extra-peritoneal treatment of the pedicle.

The formation of a sort of canal or sinus, by the adhesion together of folds of omentum or coils of intestine, in such a manner as to enclose the ligature and shut it off from the general peritoneal cavity, occurs, I believe, very generally when the ends of the ligature are not cut off. If the patient recover, one might expect more or less obstruction of intestine to follow such adhesions; and at page 427 is a drawing of a case where such obstruction was actually proved. When the ends of the ligature are cut off and the pedicle returned, we know that a similar adhesion of neighbouring intestine sometimes takes place around the end of the pedicle; and that, in some cases, pus has been circumscribed in this manner—until at length it has found an outlet, either through the abdominal wall, the vagina, or intestine. The occasional observation of cases of this kind led me to believe that the clamp, or some other extra-peritoneal method, is not only more successful as regards the immediate result of the operation, but still more so if we look to the subsequent health of the patient. Patients who recover after the extra-peritoneal treatment of the pedicle, as a rule, soon regain and maintain perfect health. So do many of those who recover after the intra-peritoneal treatment. But some of them, sooner or later, suffer from chronic suppuration, hæmatocele, or fæcal fistula; or, perhaps without any definite local ailment, are many months before they become strong and well. This, however, must be considerably modified by what has been observed since the use of antiseptics. For in the four years since I have combined the antiseptic and intra-peritoneal methods I can record rapid and complete recovery as the rule; and have not noted one case either of chronic suppuration or fæcal fistula, and only one of hæmatocele, and that doubtful.

TETANUS.

If my own experience of four cases in more than one thousand cases of completed ovariotomy may be taken as any guide in estimating the frequency of tetanus after ovariotomy, we might say that it occurred once in from 250 to 300 cases. And there is more probability that this is a correct estimate because it is supported by the fact that the 300 cases col-

lected by Dr. Lyman with a view to ascertain the causes of death, furnished exactly one case of tetanus. Olshausen gives a table of twenty cases, and some particulars of four others, of tetanus after ovariotomy, only one of which, and that in my own practice, recovered; and Stilling lost seven patients from this complication, out of a total of twenty-nine operated on for ovariotomy.

It is remarkable that, of the four cases of tetanus which have occurred in my practice, three showed themselves very early, namely, the 9th, the 12th, and the 35th cases, and I did not see another till the 898th; a run of more than 850 ovariotomies without a sign of tetanus. The two first cases were in October 1859; the third did not appear till May 1862, at which time several other deaths from tetanus were registered in London, two having followed the simple operation of tapping for hydrocele. From May 1862 till June 1878, or 16 years, I saw not a single case of tetanus, nor have I had the misfortune since. Among all my operations for the removal of uterine tumours, ovariotomy twice on the same patient, incomplete operations and exploratory incisions, there were none. Four cases of tetanus following ovariotomy are the only ones which I have to record, and this really is in the proportion of one in about 300 for all gastrotomy operations. I must certainly have tapped ovarian cysts a thousand times, have removed a great many tumours of the breast and from other parts of the body every year; and I have performed a large number of plastic operations, such as closing vesico-vaginal fistulæ and restoring ruptured perineum, without this accident, except in one instance where it followed the operation for ruptured perineum. In this case, and in three out of the four where it happened after ovariotomy, the patients themselves attributed the access of the symptoms to a chill. In the perineal case it was very remarkable, as the premonitory stiffness and spasms appeared shortly after the removal of the patient's bed to a spot immediately beneath an open ventilating shaft. In one of the ovariotomy cases no note has been made as to chill, but in the three others it was distinctly observed that the tetanic symptoms came on after an exposure to a draught of cold air when the patients were incautiously uncovered. As preventive treatment, the necessity of protecting

women after operation from currents of cold air, or chill in any way, is clearly shown. In regard to curative treatment, it is interesting to state that the only case of the 29 collected by Olshausen which recovered was that which I treated with woorara. Any one wishing to follow out this subject may refer to a paper of mine read at the meeting of the Medico-Chirurgical Society in November 1859, and published in their proceedings. In the other cases chloroform was given freely, woorara was again tried but without any apparent good result, and opium was used. All treatment, however, was as ineffectual as it is generally found to be, except in the very chronic cases. In one case I excised the remnant of the exposed pedicle and a portion of omentum which had been tied and brought out through the wound, hoping that, as injured nerves in the pedicle might be the origin of some injurious reflex action, when the cause of the mischief was taken away, there would be some mitigation of the symptoms. Olshausen attributes the high mortality which he has tabulated partly to the irritation of hare-lip pins, but the greater proportion of it to insufficient tightness of the clamp, indicated by secondary hæmorrhage, so that the nerves of the pedicle were not so thoroughly crushed as to render them powerless in exciting marked reflex action. Messrs. Harris and Doran recently examined the spinal cord after the death of a woman in the Samaritan Hospital, and in their report to the Pathological Society state that they only found appearances which are seen after other diseases, such as exudations, dilated vessels, want of symmetry and exuberant proliferation in the central canal; and they conclude that the clinical symptoms do not encourage us in the expectation of finding any specific change in the cord, though it is unquestionably the structure partly, if not chiefly, at fault. Here there was no apparent local morbid action, and, so far as my own cases are concerned, I have no reason to believe that any pathological condition connected with the operation had anything more to do with the disease than as giving the same predisposition which would come from a common wound.

CHAPTER XIII.

OVARIOTOMY DURING PREGNANCY

Ovarian tumours may not only be mistaken for pregnancy when they exist independently, but they are often complicated by its occurrence even in advanced stages of their growth. And though the diagnosis of this condition is generally to be made out by the usual order of examination, yet the complication may be revealed only at the time of the operation. Out of these circumstances several very important practical questions arise.

It may be asked, in the first place, whether in such a case it would be necessary to interfere at all, under the assumption that pregnancy and ovarian disease might go on together, and serious trouble arise only in a small percentage of cases. The early induction of premature labour has also been advocated on the grounds that rupture of the cyst, or its gangrene from rotation of the pedicle, might occur under the pressure of the enlarging uterus, while relief was often found in the advent of spontaneous premature labour. Some practitioners, again, have declared themselves in favour of tapping the ovarian cyst, rather than inducing premature labour, thus anticipating the dangers of rupture or gangrene of the cyst without sacrificing the child. And then comes the triple question, in reference to ovariotomy, whether it should be performed at all during the existence of pregnancy; whether, if done, it should be supplemented by the Cæsarean section, or Porro's operation; and, thirdly, whether if, during ovariotomy, the uterus should give way or be accidentally opened, its contents should be cleared out, or the parts left to themselves, or Porro's operation be performed.

These questions are of such vital importance that we may endeavour to arrive at some general principles or useful rules

of practice by the consideration of a series of cases in which the several difficulties presented themselves.

In commencing the study of the treatment of these cases, we naturally examine the assertion that no treatment at all is called for; that ovarian disease and pregnancy may, as a rule, be allowed to progress together without interference. I might support this doctrine by the fact that I knew one woman who, during the slow progress of an enlarging ovarian cyst, went through five pregnancies, bore five living children without unusual difficulty; and never had the cyst been tapped, nor had labour ever been prematurely or artificially induced; and by the fact that in another case where I performed ovariotomy successfully fifteen months after the birth of twins, the patient had begun to enlarge six months before marriage, and had only suffered from her excessive size during this pregnancy; and by the fact that a patient, upon whom I performed ovariotomy with success in the fourth month of pregnancy, after rupture of the cyst and peritonitis, had borne six living children during the progress of the cyst before its rupture. But I must regard these cases as exceptional, for I can only remember one other case where pregnancy complicated with ovarian disease has gone on to its natural termination in the birth of a living child; or where, in consequence of non-interference, great suffering has not arisen during or after labour, or very grave danger from rupture or rotation of the cyst; or where it has not been necessary to guard against threatening danger, and either to tap the cyst or to induce premature labour.

In the first three cases, which I now proceed to narrate, death followed the spontaneous rupture of an ovarian cyst in or before the seventh month of pregnancy.

Case 1.—On the 26th of July, 1864, I saw a lady, 29 years of age, the wife of a medical man and mother of three children, the youngest of whom was eleven months old. The catamenia had ceased eighteen weeks before my visit, and the usual symptoms of early pregnancy followed, but with severe paroxysms of pain in the right groin and right side of the abdomen. Dr. Ballard had been consulted on the 13th of June, and he afterwards informed me that he then detected fulness, with a hard, irregular tumour partially fluctuating

and somewhat tender, in the right flank, movable and dull on percussion, the fundus of an enlarged uterus being palpable above the pubes, with resonance between it and the tumour.' As the tumour grew, it extended across the hypogastrium and obscured the enlarging uterus, producing changes in the physical signs and increased sufferings, which led to different opinions being expressed as to the nature of the abdominal enlargement, and to my being consulted. Considerable doubt having been expressed as to whether a tumour which reached upwards about midway between the pubes and umbilicus was the enlarged uterus or not, I introduced the sound to the extent of six inches, having previously considered in consultation that if this proceeding should lead to abortion the result would not be undesirable. The fœtal heart and placental murmur not being audible, doubt was still felt whether the enlargement of the uterus was due to pregnancy. The uterus was pushed a little over to the left side: while on the right, not crossing the median line, an elastic tumour extended upwards beneath the false ribs, and could not be separated by percussion from the liver. I suggested that if premature labour did not come on, this tumour should be punctured. I did not see the patient again; but I heard from Dr. Ballard that on the 11th of August, a fortnight after my visit, he 'distinctly felt the movements of a child to the left of and below the umbilicus. The patient had by this time lost flesh considerably, but her pain had been tolerable, and for some days she was free from it altogether. On the 26th of September it returned with great severity, with evidence of peritonitis. On the 28th she was believed to be in labour, and was seen by Dr. Oldham and Dr. Barnes. The membranes protruding, they were ruptured, and some hours afterwards a female child was born, which lived twenty-four hours. The symptoms of peritonitis continued, and the patient died four days after the delivery.'

After death Dr. Ballard found a very large cyst of the right ovary, occupying the whole of the right side of the abdomen, and extending four inches to the left of the median line. It was flaccid, as if partially emptied, and a large quantity of bloody serous fluid lay in the lower part of the abdominal cavity. The pedicle, an inch and a half long, was twisted into

a sort of rope, and the walls of the cyst were infiltrated with blood. Within the cyst there was much bloody serum with several very firm clots. Some of the contents of the cyst had evidently escaped through an opening in a very thin part of the cyst wall posteriorly, and had, no doubt, caused the peritonitis which proved fatal.

Case 2.—In May 1868 I went to Stafford to see, in consultation with Dr. Day, a lady who was in the fifth month of pregnancy and was also suffering from an ovarian tumour, which had been discovered by her husband on the night of marriage in October 1866. She was twenty-four years of age, had long suffered from hysterical attacks, but nothing had led to any examination of the abdomen until the movable tumour in the right iliac region was discovered, which she appeared to be quite ignorant of, and said she had never noticed. It was about the size of a very large orange. Dr. Oldham, who saw it a few days afterwards, considered it to be an ovarian tumour. From the time of marriage, the tumour evidently but slowly increased in size, and was the seat of frequent darting pains. Eight months after marriage she became pregnant, miscarried six weeks after conception, and recovered without any unfavourable symptom. From this time till the end of 1867 there was no decided increase nor other change in the tumour. Then a second pregnancy occurred. She began to suffer from intense pain in the tumour, and became restless and desponding. It was in the fifth month of this second pregnancy that I saw her, and found an ovarian cyst as large as an adult head above and to the right of the uterus. At that time there was no very great suffering, but I advised that the cyst should be tapped if relief was called for by any increased distress. At about the sixth month premature labour came on spontaneously, and she was delivered of a dead child. From the period of her delivery many of her symptoms subsided; she slept well, was cheerful, and the tumour was less painful. But after about a week she began to complain of more pain in the tumour, and it increased rapidly in size. Her hysterical symptoms became aggravated to a degree almost amounting to mania. Dr. Day informed me that 'the tumour, although increasing rapidly in size and becoming very tense and

hard, was not so large as to render the abdominal walls very tense, or to press upon other organs so as to interfere with the performance of their functions. The pulse, which had fallen in frequency after the premature delivery, again became weak, and rose to 120. This state continued without alteration for about a week or ten days. One morning, after turning somewhat suddenly in bed, she cried out that something had broken inside, and died almost instantly. No post-mortem was made, but the abdomen was found to be perfectly flaccid. Not a trace of the tumour could be felt.'

Case 3.—On the 16th of January, 1869, I met Dr. Finch, of Blackheath, and Dr. Furley, of Malling, in consultation upon a lady, 24 years of age, who had been married about nine months. Between two and three months after marriage the catamenia ceased, she increased in size, and considered herself pregnant. After a long drive, which shook her very much, on the 20th of November, she was seized at night with intense pain. Dr. Finch was sent for and told that abortion was threatening, but he found her suffering from a severe attack of acute peritonitis, the abdomen being greatly distended, and containing a tumour the size of the uterus at nearly the full period. There was no injection of the mammary areolæ, nor any other sign of pregnancy. The next day she was seen by a distinguished physician-accoucheur, who could not satisfy himself as to the existence of pregnancy. The acute symptoms subsided, and on the 23rd of November the physician just alluded to and another eminent physician-accoucheur, who had seen the lady some years before, met Dr. Finch in consultation.

This gentleman, although admitting some doubt, expressed himself pretty confidently as to pregnancy, on account of the soft cushiony state of the cervix uteri, seldom found in young newly married women when not pregnant. He said that he had seen the patient in 1865, who had then told him that, five years before that time, after a chill when dancing, she had felt pains which had been followed by enlargement in the left groin. A tumour, irregularly nodular, not fluctuating, and movable, was felt in 1865, reaching nearly to the umbilicus in the centre, and nearly up to the false ribs on the

left side. He then regarded the tumour as probably ovarian, and considered that it had not much enlarged since, but had become complicated with pregnancy. After this consultation the health improved, and, notwithstanding some slight symptoms of peritonitis, on several occasions she was able to walk about her room. The abdomen gradually increased in size, and at my first and only visit I could distinctly trace the boundaries of three tumours, or separable portions of one tumour—one central, extending upwards half way from the pubes to the umbilicus; one on the left side, extending into the left flank and reaching about an inch above the umbilicus; and one on the right side, extending nearly to the false ribs. The central tumour felt exactly like a pregnant uterus. The tumours to the right and left were not fluctuating, but they felt softer than fibroid tumours of the uterus usually do. The cervix uteri was shortened and softened, strongly supporting the belief in the pregnancy. But no sound of fœtal heart nor placental murmur could be detected. To the left of the cervix, projecting towards the bladder, a hard nodulated tumour, as large as three or four walnuts, closely connected with the body of the uterus, could be felt. This, I felt sure, was a fibroid outgrowth from the uterus, and I made a diagram illustrating my diagnosis of pregnancy with a small hard fibroid outgrowth from the body of the uterus, and two softer tumours, which might be either ovarian tumours or soft uterine fibroids; and I advised that the physicians who had seen her six weeks before should see her again, and consult as to the propriety of inducing premature labour, as I did not thing that tapping could lead to any considerable diminution in the size of either of the tumours.

A fortnight after this advice was given, Dr. Finch distinctly heard the fœtal heart. This was on January 29. On February 8, at four in the morning, after a quiet day on the 7th, free from much pain, she awoke after three hours' sleep, complained of pain, asked for fomentations of hot water, then coughed, fell back, and suddenly died. Dr. Finch adds, 'I presume, from the bursting of a large cyst, but I had no opportunity of making a post-mortem examination.'

Cases 4 and 5.—It is unnecessary to detail the particulars

of these cases, the simple facts being that two patients who were pregnant had also large ovarian cysts, which I thought should be emptied by tapping, but my advice was not followed. Both women suffered excessively from distension, had lingering labours and still-born children. In both ovariotomy was performed a few weeks after delivery, successfully in one, with a fatal result in the other.

I have also notes of five cases of patients whom I have tapped during pregnancy, one of them three times, one twice, and three once. In all these women great relief was afforded by the tapping, no ill effect of any kind was observed to follow it, and in all cases the children were born alive after labours of moderate duration. One of these cases is of sufficient interest to deserve a short report.

Case 6.—In November 1865 I performed ovariotomy with a successful result upon a married woman, forty years of age, four months after the birth of a living child at the full term of pregnancy. I had tapped this woman two months before her delivery. She was sent to me by Mr. Ward, of Newark, in May 1865. He had tapped her twice, removing nearly four gallons of fluid each time. The first tapping was in April 1864, the second in February 1865. When I saw her first she had been married three years, and had not had a child. The catamenia became scanty about the time of her marriage, and '*got less and less till they left her*,' in November 1864. The abdomen was greatly distended, and nothing could be detected except a very large ovarian cyst, nor could the patient believe that she was pregnant. But the cervix uteri was found to be short and velvety, and *ballottement* was very distinct. The mammary areolæ were injected, the corpuscles well developed, and a little colostrum was squeezed from the nipples. As the suffering from distension was very great and immediate relief necessary, I tapped on May 13, and removed eighteen pints of fluid. The enlarged uterus was then felt nearly up to the umbilicus, the collapsed cyst to the left, and the fœtal heart was heard below and to the left of the umbilicus. Immediate relief followed the tapping. A healthy child was born on July 20, at the full term of pregnancy. The patient was too weak to nurse it. The cyst refilled, and I removed it in the Samaritan Hospital on November 29, 1865. There were

very extensive adhesions, but the patient made an excellent recovery, and had another child in September 1867. I heard from her in November 1881 as being quite well.

Case 139.—As I published a very full report of this case in the 'Medical Times and Gazette' of September 30, 1865, I need not do more now than point out its bearing upon the question of the performance of ovariotomy during pregnancy. In this case I entirely overlooked the coexistence of pregnancy with ovarian disease, and after the removal of an adherent multilocular cyst of the left ovary, weighing about twenty-eight pounds, I felt what I thought was a cyst of the right ovary, tapped it, and then found that it was the gravid uterus. As this stage of the operation is of some importance in the history of the Cæsarean section, being, I believe, the first case in which the opening in the uterine wall was closed by sutures, I quote the following passage from the report published at the time :—

'Some two or three pints of bloody fluid having escaped through the canula, the tumour became much less tense; and on bringing it up to the surface I saw the Fallopian tube passing from its upper part towards the left side, and knew at once that I had punctured the uterus. On withdrawing the canula, a soft, spongy, bleeding mass protruded, and on putting in my finger to push this back and examine the uterine cavity, the anterior wall of the uterus—which was very soft and friable, as if it had undergone fatty-degeneration—gave way along the middle line from the puncture (which was near the fundus) for an extent of from three to four inches down the body towards the neck. With very slight pressure a quantity of liquor amnii and a fœtus of about five months escaped. I then easily peeled off the placenta from the inner surface of the uterus. The organ did not contract, and there was free bleeding from three vessels close beneath the peritoneum at the lower angle of the rupture in the uterus. These vessels were secured by three silk ligatures. Oozing still going on from the surface where the placenta had been attached, I made a free opening into the vagina by passing my finger from above through the cervix and os, and then put a piece of ice into the uterus, and held it within by firmly grasping the organ, which then contracted. I then brought the peritoneal edges of the tear in the uterus

together by an uninterrupted suture of fine silk, one long end of which I had previously passed into the uterine cavity, and out through the os into the vagina. By seven or eight points the edges were brought accurately together, and the other end of the silk was brought out through the opening in the abdominal wall, with the ends of the three ligatures on the vessels in the uterine wall, close to the pedicle, and all were tied to the clamp.'

Any one interested in the progress of this patient after this complicated operation may find a very full report in the Journal to which I have referred. All I need say now is that the patient completely recovered. She went to the Convalescent Hospital at Eastbourne thirty-three days after operation, and I have seen her several times since in excellent health, the last time in 1880. She reports herself well in 1881.

The interest of this case in relation to the subject under notice is in its bearing on the question, 'What should be done when a pregnant uterus is discovered during some stage of ovariotomy?' My answer would be, 'Let it alone.' But in a case of Dr. Atlee's in 1850, ovariotomy performed in the second month of pregnancy was 'followed by such great irritability of stomach, in consequence of the state of pregnancy, that she could not be nourished, and she died, thirty days after, of starvation.' And in a case by Mr. Burd, of Shrewsbury, in 1847, of ovariotomy performed between the third and fourth months of pregnancy, abortion took place two days after operation, and was followed by alarming symptons, lasting several days. Still the patient recovered. So Dr. Marion Sims performed ovariotomy in the third month of pregnancy, and did not detect pregnancy until the ovarian tumour had been removed. The patient recovered well, went the full term, and was safely delivered of a fine child.

Supposing the operator has penetrated the uterus, if any conclusion can be drawn from the case in which I made this mistake and emptied the uterus, and two other cases in which the same mistake was made by other surgeons, who did not empty the uterus, but closed the puncture in its wall by wire sutures, both patients having died after aborting, while mine recovered, it would appear to be the safer practice to empty the uterus, and either to close the opening in the uterine wall

by suture, or to perform supra-vaginal amputation of the uterus as advised and practised by Porro first, and afterwards by other Continental surgeons.

I now proceed to relate four other cases occurring in my first series of five hundred, in one of which ovariotomy was performed at the fourth month of pregnancy, after rupture of the cyst and peritonitis; in the second, third, and fourth the operation was a matter of election to avoid other dangers. The result was successful in all of them, the mothers being saved, three of them giving birth to living children after natural labours at the full period of pregnancy, and the fourth having recovered well after a rapid labour eleven weeks after ovariotomy.

Case 330.—The wife of an hotel-keeper, thirty-six years of age, mother of eight children, first consulted Mr. Bateman on July 23, 1869. About a fortnight before this an abdominal tumour, which had been slowly increasing after the birth of twins sixteen years before, and had not prevented the birth of six other children, had suddenly and rapidly increased in size after an attack of severe abdominal pain and tenderness with sickness and fever. When Mr. Bateman was called in he considered 'the case was full of peril, for, although the abdominal tenderness was subsiding, the effusion was increasing. There was considerable difficulty of breathing on lying down, and great restlessness, with scanty and deep-coloured urine, abounding in lithates.' Mr. Bateman's diagnosis was 'ovarian tumour on the right side, ascites, pregnancy of about three months' duration, and extensive recto-vaginal protrusion.' On August 13, I saw the patient with Mr. Bateman by his desire, and entirely concurred in his diagnosis as to the presence of an ovarian tumour with free fluid surrounding it in the peritoneal cavity, and depressing the recto-vaginal pouch, and in the existence of pregnancy about the commencement of the fourth month. 'We also came to the conclusion' (I now quote from Mr. Bateman) 'that the fluid in the peritoneal cavity was ovarian fluid, the sudden attack of pain when I was first called in having been caused, in all probability, by the rupture of part of the wall of a multilocular cyst, and the escape of the contents of a large cyst. Pain, tenderness, raised temperature, rapid pulse, dry tongue, and sickness, all pointed to diffused peritonitis, and a condition requiring immediate relief.' On

the following day I performed ovariotomy, most ably assisted by Mr. Bateman, by Dr. Jagielski, and by Professor Neugebauer, of Warsaw, Dr. Junker administering bichloride of methylene with his usual care and success. Our diagnosis was completely verified. There was general injection of the peritoneum, but no recent lymph. The only adhesion was to omentum. The tumour, with its contents and the fluid surrounding it, weighed altogether thirty-seven pounds. I was extremely careful to cleanse the peritoneal cavity completely from all ovarian fluid by repeated sponging before closing the wound.

The patient recovered perfectly well, went from London to Ramsgate twenty-eight days after the operation, and arrived there with very little fatigue. She returned in excellent health, and pregnancy went on without any unusual symptom.

In the 'Lancet' of March 19, 1870, Mr. Bateman states that this patient was safely delivered of a living child on February 18, after a natural labour, and went on well afterwards. But she died in 1871 of malignant disease of the uterus.

Case 399.—In this case I was acting with Mr. Goddard, of Highbury, and I feel much satisfaction in reprinting his report to the Obstetrical Society.

'In August 1869 I attended a lady, twenty-eight years of age, in her fifth confinement. She was married in 1863, and her eldest child was born in the same year. She had one abortion in 1868. After the delivery in 1869 some fulness of the abdomen, not observed after previous confinements, was noticed, and the increase in size went on gradually. Occasional pain in the left groin and hip had been felt for the previous four years. In August 1870 Mr. Spencer Wells saw her with me, and confirmed my opinion that an ovarian cyst of considerable size was present; but as the general health was good, and there was no very urgent symptom, we agreed to defer any consideration of surgical treatment. On October 17, 1870, a regular catamenial period ceased, and symptoms of pregnancy began within a fortnight—sickness and frequent micturition, as in previous pregnancies. At the next period in November there were no signs of menstruation, and increase in size continued. On December 12, a second period was due and

passed over, nausea and discomfort increasing with the increasing size of the abdomen.

'Taking all the circumstances of the case into careful consideration with Mr. Spencer Wells, it was agreed that he should perform ovariotomy on December 20, 1870, and he did so, assisted by Dr. Legouest, of Paris, by Dr. Bantock, by my friend Dr. Shepherd, and by my father and myself. Complete anæsthesia was maintained by Dr. Day with chloro-methyl. An incision five inches long between the umbilicus and pubes exposed a non-adherent ovarian cyst, which was tapped, and one large cavity was emptied. The principal cyst was then opened, cysts broken up, and the whole tumour was drawn out without any of the contents escaping into the peritoneal cavity. A long narrow pedicle on the left side was secured in a small clamp, which was fixed outside the abdominal wall. Scarcely any blood was lost. The right ovary was healthy. The uterus appeared to be as large as a cocoa-nut, and Mr. Wells said it felt like a thin cyst, larger than he should have expected at the commencement of the third month of pregnancy. The wound was united by silk sutures passed through the whole thickness of the abdominal wall. The fluid removed measured eleven and a half pints; the weight of the cyst and solid matter was three and a quarter pounds. Total, about fifteen pounds.

'I have little to say of the progress after the operation except that recovery was rapid and complete. The clamp was removed, and the bowels acted on the eighth day. Pregnancy went on quite unaffected by the operation, and a healthy child was born after a natural labour on July 29, 1871. The lady has nursed her child, and has gone on quite as well as after any previous confinement.'

This lady is, in 1881, in good health, and, besides the child born seven months after the operation, has had three other fine strong children, born in 1873, 1876, and 1878.

Case 419.—A married lady, thirty-eight years of age, mother of five children, and whose own mother had died of dropsy and some sort of abdominal tumour, was introduced to me in April 1871 by Dr. Ross. Eighteen years ago, before her marriage, he had discovered the existence of a tumour, and observing its progress, found at each delivery that it had diminished during the pregnancy. All the deliveries were natural except one, and

in that Dr. Ross turned. Soon after the birth of each child the tumour began again to increase, but never so much as within the last six months, the youngest child being eight months old. My diagnosis was, ovarian cyst, probably dermoid, uterus free, early pregnancy; and on May 4, I performed ovariotomy.

An incision of five inches midway between the umbilicus and symphysis pubis exposed a free cyst, which was tapped. The tube was immediately plugged, no fluid escaping; and on removing it, and a mass of hair and fat, a quantity of fluid gushed away, and a cyst was drawn out, with a coil of intestine, and large shreds of adhering omentum (very vascular). On separating the omentum and intestine, I found that there was no pedicle, the blood supply of the cyst having been kept up by the omental vessels, and some large vessels near the cæcal appendix, where the intestine appeared thick and contracted. Several vessels and shreds of omentum were tied and returned with the ligatures cut off short. The left ovary was three times its natural size, with large vesicles and opaque spots on their coats. I decided not to remove it. The uterus was large and cyst-like, and at the second month of pregnancy. The wound was closed with sutures.

The solid part of the cyst weighed about two pounds, and it contained as much as thirty-two pints of fluid. A large quantity of loose hair, with fatty matter, which became solid on cooling, was removed from the cyst. Part of the cyst wall was to the naked eye exactly like skin, and elsewhere it was inlaid with small bony plates. The recovery was uninterrupted, and in the month of December Dr. Ross wrote to me saying that the patient was delivered of a fine female child, after a labour of about thirteen hours. She went on perfectly well, and was in good health in May 1872, but in the summer of 1881 was very ill with pulmonary disease, and had also an abdominal tumour of doubtful nature.

Case 476.—A married woman, twenty-nine years of age, mother of one child, was sent to me by Dr. Moore, of Ipswich, early in the year 1872, with tumour in the right side, recognized as ovarian. She was tolerably healthy, fresh-looking, but thin. The skin of the abdomen was tense and glistening, the linea albicantes well marked. There was tenderness on the

right side, with distinct fluctuation, but no crepitus; the sounds on percussion, clear superiorly, and changing with the position; in the lumbar region dull when the patient was on her back, clear when on her side. The uterus was in its natural position, cervix movable and soft, the os patulous. The catamenia had ceased for three months, having previously been regular and natural. The urine was clear, acid, not albuminous, but loaded with lithic acid. The general health was not much affected; pulse 100; sounds of the heart normal; and no special hereditary tendency to disease.

She first noticed the enlargement twelve months before, and attributed it to pregnancy; but from the recurrence of the menses she became doubtful, and at the end of eight months was no larger than at the third. The tumour was at first felt more in the right side, and caused neither pain nor tenderness, nor any other particular symptoms.

Within the last month she had increased rapidly, and, though pregnancy of the fourth month was discovered, the body was so tense on admission to the Samaritan Hospital that she was tapped with lancet and canula, and several pints of fluid removed from the peritoneal cavity. After tapping, a small, hard, movable tumour could be felt in the right iliac region, which I supposed to be the solid part of a multilocular tumour which had burst. The size of the uterus, softness of the cervix, and absence of the catamenia for three months made pregnancy almost certain.

On March 13, I performed ovariotomy, making an incision of five inches midway between the umbilicus and symphysis pubis. About five pints of clear fluid escaped from the peritoneal cavity, and I felt the large uterus just like a tense thin cyst. To its right and above was a hard tumour, held up by omentum which adhered to it, and having the right Fallopian tube only separated from it by the broad ligament. I transfixed the ligament by a needle carrying strong silk. A large vein which was punctured bled freely, but on tightening the silk, and tying the ligament, bleeding stopped. I cut away the tumour, leaving the Fallopian tube untouched, and cut off the ends of the ligatures short. Short ligatures were used. I did not feel either ovary; the uterus being so large and tense, I was anxious not to disturb it. On the fifth day the wound was

healed, and the stitches were removed. The patient recovered without any symptom of abortion, was delivered on May 27 of a small child, after a rapid labour, at the sixth month of pregnancy, and did well. She has since given birth to a girl at the full time, 1873, who is still living. The mother reports herself well in 1881.

The tumour was a nearly solid mass of white fibrous tissue, infiltrated in places with a thick transparent fluid, which had here and there collected in the distended areolæ. But towards the upper part there was a large irregular cavity divided by imperfect septa, lined with smooth membrane, and nearly filled with blood clot, partially organised. The pedicle was a small double layer of peritoneum, about an inch and a half long, and a quarter of an inch wide, enclosing a few vessels and some areolar tissue. The tumour measured in its long diameter six inches and a half, and in its short diameter three inches and a half. It is referred to in the section on Fibrous Tumour of the Ovary.

In the second series of 500 cases of ovariotomy, I performed the operation during pregnancy five times—making ten cases in the 1,000. The following are brief notices of the five cases which occurred in the second 500.

Case 507.—Was a married woman, thirty-two years of age, and mother of seven children, who came into the hospital on account of her great suffering. Tapping only brought away a few ounces of thick colloid fluid, and as it gave no relief, ovariotomy was done three days afterwards. Pregnancy was not suspected, but the incision disclosed a large uterus below and to the left side. With it was a big multilocular cyst, weighing twenty-six pounds, which had to be opened and broken down as the contents were too thick to pass through the trocar. The pedicle was first fastened in a clamp. This caused too much dragging on the parts and was replaced by ligature about an inch away from the right side of the uterus. Four pieces of adhering omentum had to be tied and were returned. The left ovary was found applied to the side of the uterus, which was as large as at the sixth month of pregnancy. Labour pains came on the next morning, the membranes were punctured, and in about ten minutes a living child was expelled. The temperature never rose to more than 100°, and on the ninth

day the notes end. The patient recovered rapidly, and in December 1873 presented herself at the hospital with another healthy child. This has since been followed by another birth and a third pregnancy.

Case 752.—This case need not be recorded at all fully, as Dr. Kidd of Dublin has published a circumstantial account of it. It is enough to say that the lady was thirty-seven years of age, was tapped by Dr. Kidd at the fifth month of pregnancy, and that I found her in Dublin on March 21, 1876, suffering from peritonitis and obstructed intestines, and almost moribund. Some relief was obtained by tapping and the removal of nine pints of ovarian fluid from the peritoneal cavity on the evening of the same day. The next morning I took away a burst ovarian cyst. The child was born nine hours after. The patient went on well for two days, but died on the fifth day after the operation. Considering that this is the only death after my operations during pregnancy, and the desperate circumstances under which this one was undertaken, it will certainly appear that pregnancy does not add much to the danger of ovariotomy.

Case 798.—This lady was the wife of a medical man. She was forty-one years of age and the mother of six children. I tapped a multilocular ovarian cyst on September 9, 1876, and took away 5½ pints of ovarian fluid. The relief was only temporary, and on October 12 I removed an ovarian tumour weighing seven pounds. The uterus then extended upwards about half way between the pubes and umbilicus. The pedicle on the right side was secured by a clamp. She recovered perfectly, was delivered after an easy labour on April 23, 1877, and now in 1881 is quite well.

Case 817.—The wife of a soldier was sent to me by Surgeon-Major Perry and admitted into the Samaritan Hospital, October 1876. She was twenty-seven years of age, and had one child two years old. There was an ovarian tumour, and she was in the third or fourth month of pregnancy. As there were no urgent symptoms she left the hospital, but was readmitted on December 4. The fœtal heart sounds were then very distinct in the right iliac region. The fundus uteri was seven inches above the symphysis pubis, and above it was a large ovarian cyst. Ovariotomy was performed on December 11. A short

pedicle on the left side was transfixed and tied in two parts. The tumour was cut off near the ligature and the ligature returned. The tumour weighed 11½ lbs., nine pints of fluid, 2½ lbs. solid. When she was convalescent, on January 25, 1877, uterine pains came on and a child was born alive. There was very little hæmorrhage, and she left the hospital on February 12. Dr. Boulton reported the child as a female of twenty-eight weeks' average development, but it died about twenty-six hours after birth. She has had two boys since, one born in 1878, the other in 1880, and at this date in 1881 is quite well.

Case 879.—The wife of a surgeon consulted me in October 1877, four months after her marriage. She was twenty-eight years of age, and, although unsuspected at the time of marriage, there can be very little doubt that ovarian disease had begun a year or two before. She was married on June 27, 1877, and pregnancy may be dated from the first week in August. I operated on her on November 9, 1877. An ovarian tumour weighing ten pounds was removed, a short pedicle on the left side being secured in a clamp. Recovery was uninterrupted, and a well-formed healthy child was born after a rapid labour, without any chloroform being taken, before Dr. Brodie arrived, on April 15, 1878. She has had two more children since that time, and is well in 1881.

Careful consideration of the cases just related will lead, I think, to the following conclusions :—

1. Pregnancy and ovarian disease may go on together, and may end in the birth of a living child and the safety of the mother.

2. But in a large proportion of cases, probably in nearly all where an ovarian tumour is large, there is danger of abortion ; or, if the pregnancy proceed to the full term of lingering labour and a still-born child ; and throughout the later months of pregnany there is danger of sudden death to the mother from rupture of the cyst or rotation of its pedicle.

3. Spontaneous premature labour may not save the mother from these perils, and the induction of premature labour artificially almost implies sacrifice of the child with considerable risk to the mother.

4. There is no proof that tapping an ovarian cyst is more dangerous during pregnancy than at any other time ; and if

there be a large single cyst, tapping will afford immediate relief to distension at a very slight risk to the mother, and lead to the natural termination of pregnancy in the birth of a living child, if proper precautions be taken to prevent the escape of ovarian fluid into the peritoneal cavity, and the entrance of air into this cavity, and into the cavity of the cyst. In cases of multilocular cyst tapping can be of very little use.

5. In cases of multilocular cyst, or solid tumour, the rule should be to remove the tumour in an early period of pregnancy; and if an ovarian cyst should burst during pregnancy at any period, removal of the cyst and complete cleansing of the peritoneal cavity may save the life of the mother, and pregnancy may go on to the full term.

6. Of three cases on record where a pregnant uterus has been punctured during ovariotomy, the only recovery was in the one case where the uterus was emptied before the completion of the operation, and the opening in its wall closed by suture.

Cases of Ovariotomy during Pregnancy.

No.	No. in general List	Medical Attendant	Age of Patient	Period of Pregnancy	Date of Ovariotomy	Weight of Tumour	Result to Mother	Result to Child	Subsequent History
1	139	Mr. Cook, Clovelly	24	4th to 5th month	Aug. 1865	28 lbs.	Recovery	Fœtus removed at same time	Well in 1881
2	330	Mr. Bateman, Islington	36	3rd month	Aug. 1869	37 lbs.	Recovery	Alive; Natural labour Feb. 1870	Died of Cancer of Uterus, March 1871
3	399	Dr. Goddard, Highbury	28	3rd month	Dec. 1870	15 lbs.	Recovery	Alive; Natural labour July 1871	Other children born, May 1873, August 1876 and 1878. Well in 1881
4	419	Dr. Ross, Bloomsbury	38	3rd month	May 1871	34 lbs.	Recovery	Alive; Natural labour Dec. 1871	Another child born, Jan. 7, 1877. Ill with pulmonary disease and an abdominal tumour of doubtful nature in 1881
5	476	Dr. Moore, Ipswich	29	4th month	March 1872	10 lbs.	Recovery	Alive; Natural labour May 1872	Another child born, May 1873. Well in 1881
6	507	Mr. Coleman, Woolwich	32	7th month	Aug. 1872	26 lbs.	Recovery	Seven months' child born day after operation	Living children born, Dec. 1873 and March 1876. Another expected July 1877. No report since
7	752	Dr. Kidd, Dublin	38	6th month	March 1876	40 lbs.	Died five days after	Fœtus expelled six hours after operation	
8	798	Dr. Roberts, Cheshunt	41	4th month	Oct. 1876	7 lbs.	Recovery	Child born April 1877; Labour natural	Well, June 1881
9	817	Surgeon-Major Perry	27	7th month	Dec. 1876	12 lbs.	Recovery	Child born 25 days after	Two boys born, 1878 and 1880. Well in 1881
10	879	Mr. Stirling	28	4th month	Nov. 1877	10 lbs.	Recovery	Child born 6 months after	Two children since. Well in 1881

CHAPTER XIV.

ON INCOMPLETE OVARIOTOMY AND EXPLORATORY INCISIONS

When I began to publish every case where I had completed the operation of ovariotomy, and published in separate series cases where the operation was commenced but not completed, and cases where an exploratory incision only was made, I had to reply to objections advanced by critics who considered that the fatal cases of exploratory and incomplete operations ought to be counted among the unsuccessful cases of ovariotomy. If I asked whether the cases which recovered from the operation when only part of the cyst had been removed, or when a cyst had been simply emptied, should be counted among the successful cases, the answer was, 'Certainly not, because ovariotomy had been only attempted, and the attempt had failed.' One great reason why ovariotomy was so long before it was received at all cordially by the profession was, that incomplete cases, or cases of simple incision, had been classed among cases of ovariotomy, while unsuccessful cases were left unpublished. In the so-called statistical tables, cases of complete and incomplete ovariotomy and of exploratory incisions were so grouped together that it was impossible to ascertain, without a good deal of inquiry, what were the real results of even the published cases; and in some of the most recent tables this confusion is still more deplorable. I thought the best way of avoiding this error would be to give a truthful and exact account of every case in the order of its occurrence, showing how frequently the attempt to remove an ovarian tumour had been made, how often it had succeeded, what were the results of completed operations, how often the attempt had been only partially successful or had failed, what were the results of incomplete operations, how often diagnosis had been so doubtful that an exploratory incision was necessary before the doubt could be

solved, and what risk the patient incurred by submitting to an exploratory incision. This plan appeared, and still appears to be, better calculated than any other to present a true picture of the occurrence of actual daily practice, and I think the tables which I published in 1872, including every case where I attempted to perform ovariotomy, but had not completely succeeded, or had made an exploratory incision either to satisfy my own doubts or those of others, or in compliance with the earnest solicitation of a patient, gave a far better opportunity of forming a correct estimate of the real results of ovariotomy than if the fifty-two cases which they together contained had been included among the completed cases of ovariotomy. The proportionate mortality would have been slightly increased; instead of 500 cases, with 127 deaths, and a mortality of 25·4 per cent., we should have had 552 cases, with 146 deaths, and a mortality of 26·44 per cent.—a difference of not much more than 1 per cent.—while discredit would have been thrown upon the whole series of cases by the manifest fallacy that cases were enumerated as ovariotomy where the operation had only been begun and could not be finished, and that the patients who recovered from the operation were not cured of the disease even if they gained some temporary benefit. By correctly classifying all the cases, as I did in three series, it appears to me that all possible objection was removed. It was seen that while in some fourteen years the operation of ovariotomy had been completed by me five hundred times, it had during the same period been found impossible to complete it in twenty-eight cases, and that in twenty-four other cases exploratory incisions were necessary to perfect diagnosis.

On looking over the tables formerly published, and in adding cases of exploratory and incomplete operations since, thirty-three in number, making 85, to the 1,000 completed ovariotomy cases, I find that in almost every case doubts or suspicions entertained before the incision was made were confirmed, and I scarcely recollect a case where an exploratory incision was thought to be necessary and which proved to be an ordinary case of ovarian disease. Occasionally, after commencing by an exploratory incision, I have found it possible to remove an ovarian tumour, but there has always been some peculiarity in the case which led to this unusually cautious mode of proce-

dure. Any one who will carefully study the chapter on diagnosis, in the earlier part of this volume, will find, I think, good reason for believing that the diagnosis of ovarian tumours, and of the conditions favourable or otherwise for operation, is already as well established as that of any other form of disease requiring surgical operation. No surgeon about to attempt to relieve a strangulated hernia can foresee exactly the conditions he may meet with; the lithotomist may find a larger or smaller stone than he expects; aneurism is not always cured by the ligature of the artery supposed to be involved; and mammary tumours supposed to be malignant are found not to be so in some cases after removal, or those supposed to be innocent prove to be malignant. Indeed, throughout all surgery we share with physicians the difficulty of practising an *ars conjecturalis*, and it is no reproach to a surgeon, if, acknowledging doubt, he endeavours to clear up that doubt by commencing his operation with an exploratory incision. The fact that only twenty-four cases of exploratory incision occurred during the period in which I completed ovariotomy five hundred times proves that in a large majority of cases an accurate diagnosis may be made even without an exploratory incision. With our present knowledge it is almost incomprehensible that Dr. Frederick Bird should have been compelled by Mr. Cæsar Hawkins to acknowledge that, in addition to the few cases of ovariotomy which he had completed and published, he had also made exploratory incisions, or had commenced the operation and had failed to complete it, in about forty other cases which he had neither published nor alluded to until questioned by Mr. Hawkins. And there can be no doubt that if a surgeon for every case of completed ovariotomy must necessarily encounter such difficulties that he would be compelled to leave several cases incomplete, or meet with such insuperable difficulties in diagnosis that he could only satisfactorily clear them up by an incision, it would be a very grave objection to the principle of the operation. Happily, with advancing knowledge doubts are being cleared up and difficulties lessened, exploratory incisions are becoming less frequently necessary, and incomplete are bearing a diminishing proportion to completed operations. Concurrently with the second series of 500 ovariotomies, I had only thirty-three cases of incomplete operation or exploratory

incision, with a loss of fourteen patients—thus reducing the proportion of unsuccessful cases from 10 per cent. to about $6\frac{1}{2}$—and this even now goes on lessening. In fact, I had only three cases of incomplete operation during the two years which intervened between my lectures at the College of Surgeons and the making up of my 1,000 completed ovariotomies.

Of the first twenty-four patients subjected to exploring incisions seventeen recovered from the incision or were relieved by it; in seven cases death followed from three to ten days after incision. In two recovery appears to have been permanent and complete. In others the disease has gone on very much as if the patient had been only tapped; the patients were as much or more relieved than by tapping, but not permanently cured.

The cases of incomplete operation as distinguished from those of simple exploratory incision might perhaps have been included in the same table as in many of them difficulties were anticipated and an exploratory incision even proposed, but in almost all something more than an incision was done, such as separation of adhesions, or emptying, or partial removal of the cysts.

Of the twenty-eight patients so treated death was hastened by the operation in eleven or twelve, they having died at various periods from one to eleven days afterwards. Others were neither more nor less relieved than they would have been by an ordinary tapping. In some the natural progress and termination of the disease were neither hastened nor checked, in some life was certainly prolonged, and in some recovery appeared for a time to be complete.

In three cases none of the cyst was removed, but a permanent opening was kept up, and after suppurative inflammation a cure obtained, which in the following case was complete.

Early in December 1864, I was asked by Mr. Nicholson, of Stratford Green, to see a housemaid twenty-two years of age, and single, who was suffering under ovarian disease. A tumour was felt occupying the lower part of the belly, and rising four or five inches above the umbilicus. It was not tender on pressure; fluctuation in it was perceptible, but was not very distinct. The patient had commenced to menstruate at the age of fourteen, and had always lost a good deal of blood every

fortnight. The uterus was high and rather far back; the cervix was movable; while a soft elastic tumour was to be felt depressing the anterior wall of the vagina. On the father's side the patient came of a strong family; her mother had, however, been delicate. She herself had at one time been supposed to have a hernia on the right side. No trace of it was felt.

About eight months before I saw her the patient was much troubled with pain in the right hip, and shortly afterwards she discovered a small tumour in the lower part of the abdomen. For six months symptoms of pressure on the bladder supervened occasionally, and pain and numbness continued in the right leg. The tumour increased slowly at first, and then more quickly, until it reached the size already mentioned. The patient was advised to wait before anything was done. On New Year's Day, 1865, she had a smart attack of pain in the right thigh, and three days later I felt some recent lymph over the anterior surface of the tumour.

The patient was admitted to the Samaritan Hospital on January 17, 1865. The catamenia had just come on. When they ceased—after some consultations rendered necessary by a questionable state of the apex of the right lung—it was decided not to delay ovariotomy by any preliminary tapping, and on February 6, 1865, Dr. Parson having chloroformed the patient at 3 P.M., Drs. Dehn, of Hamburg, Marion Sims, and Mr. Wright, of Nottingham, being present, I made an incision from one inch below the umbilicus downwards for five inches. There were no adhesions anteriorly, but after tapping the principal cyst, and emptying it of several pints of fluid containing much blood, its attachments to the brim of the pelvis and to the right side of the uterus were found to be so close that I resolved not to attempt their separation, but to replace the empty cyst. There was, however, such free hæmorrhage from the opening into the cyst made by the trocar, and even from the little punctures made by the hooks which seized the cyst wall, that it was obviously unsafe to return it; and I transfixed the edges of the external parietal wound, and of the cyst wound, with a hare-lip pin, and secured them together with a twisted suture. The rest of the abdominal wound was closed with four deep silk sutures above the pin, and one below it.

The patient rallied well; pain was not excessive. Twenty drops of laudanum were given at 5. At eight she was easier than she had been, but the skin was hot; the tongue very dry; the lips parched; the pulse 120; respiration 52. A pint of clear urine was drawn off. I thought of bleeding, but resolved to wait for two hours to see whether perspiration would break out, the aspect being good and the state of the urine favourable. At 10.30 the patient was found to have been sick; the pulse was 136, the respiration 52. At 10.45 I bled to 10 oz. rapidly in a full stream. At 11 the pulse was 124, the respiration 48; the face rather pallid; the pulse still incompressible although fuller than before the bleeding. At 12.20 the pulse was 124, the respiration 40. Next day the face was flushed, and the tongue still parched; the skin, although hot, was moist; the pulse, 120; respiration, 28. I cut away the thread around the pin, but left the pin itself. On the second day the patient was much better; her pulse was only 116. The stitches were removed in due time, and a very free discharge of serum gradually set up, just at the point where the cyst had been pinned to the abdominal wall. Convalescence progressed, and on February 26 the patient was sent to Eastbourne. I next saw her on May 11. There was then a very little discharge from the bottom of the cicatrix, and a slight hardness and elastic swelling felt per vaginam. The abdominal tumour had disappeared. She returned to her situation, and I saw her again in July in excellent health, the catamenia being regular, and with a very slight moisture only at the lower end of the cicatrix.

She became servant in a family at Camberwell, where she remained in excellent health, and called on me quite strong in February 1868. I saw her early in 1872 in excellent health.

In the second of these three cases the patient was in good health for nearly three years after the operation, and then died almost immediately after a subcutaneous injection of morphia in Germany; and in the third case a careful examination, in July 1872, failed to detect any trace of the cyst.

The result of the thirty-three cases of incision and incomplete operation during the time of my second series of 500 ovariotomies was that ten women died within ten days of the

operation, four died between the tenth and the fiftieth day, eleven lived from five months to five years afterwards, five are not only alive but well in 1881, and three recovered, but have made no report since. The mortality upon the whole eighty-five cases is 38·8 per cent., and if we add the eighty-five cases to the 1,000 completed operations, the number of deaths is increased by thirty-three, making together 265; and this raises the percentage of mortality a fraction more than 1 per cent., so that instead of being 23·2 it mounts to 24·4, a result not much differing from what was found in the first series of 500 ovariotomies with their attendant incomplete operations.

In May 1877, I attempted to remove an ovarian cyst from an unmarried girl, in the Samaritan Hospital, who was about seventeen years of age. I found such inseparable attachments that I contented myself with clearing the cyst cavity of six pints of purulent fluid and flakes of lymph, and closing the cyst and abdominal wall round a glass tube—covering the end of the tube with a carbolized sponge. The patient remained in the hospital till August 16, suffering from a good deal of fever, treated by the ice-cap and quinine, while the cyst was duly washed out with carbolized solutions. After she left the hospital sulphurous acid was substituted for the carbolic with an immediate change for the better in the condition of the patient. A continuous stream of the diluted solution was kept running through the cyst by a syphon arrangement, and at the same time she was vigorously nourished. She recovered sufficiently well to become a useful nurse, although there was at times some discharge from the sinus in the abdominal wall which never entirely closed. She was nursing in the Samaritan Hospital in the early part of 1881, but died towards the end of the year, or the beginning of 1882.

In 1880, and in 1881 I twice laid open adherent cysts, but did not attempt to remove them, trusting to the free escape of their fluid contents into the peritoneal cavity and absorption. In neither case, so far, has there been any sign of reformation of fluid.

The painful position of a surgeon who has laid bare an ovarian tumour, has partly emptied it, has possibly separated some adhesions, and then begins to fear that he cannot completely remove the tumour, can only be estimated by those

who have unexpectedly found themselves in similar difficulties. If the difficulty is recognized early, and the cyst only exposed and emptied, the patient is scarcely in a worse condition than after tapping. Indeed, the incision leads to the avoidance of some of the dangers of tapping; the surgeon can see what vessels he wounds, and he can close the opening in the cyst if he pleases, while a short incision in the abdominal wall can by itself add little to the risk submitted to by the patient. But if extensive adhesions have been separated, the surgeon is tempted at any risk to complete the operation by the feeling that he can hardly leave his patient in a worse state, and that her only hope is in his boldly following out his intentions. In the very first case I ever operated on, the patient recovered from the incision, died four months afterwards from spontaneous rupture of the cyst into the peritoneal cavity, when it was found that there would have been no insuperable difficulty if the operation had been proceeded with. On the other hand, post-mortem examination has shown that some of the tumours could not have been removed during the life of the patient, as they could only be separated after death by careful dissection.

In any case where difficulty threatens to be insuperable, rather than persevere at any risk, the surgeon acts more prudently if he proceed after the manner described at page 461. In this case the cyst-opening and wound were closed, but afterwards opened, and no return of the disease had appeared seven years after the operation. In the cases where drainage proved so successful, complete recovery following suppuration, a drainage-tube or catheter was fixed in the empty cyst and brought out through the wound, which was closed around it at the time of operation.

CHAPTER XV.

RECENT EXTENSIONS OF OVARIOTOMY

THERE are no means of judging what would be the risk of simple castration in ordinary adult women. But from what we know of it as practised on the lower animals it would probably be trifling. It is not, however, a matter of much practical importance, since instinctively and theoretically right as may be the Aborigines of Australia in performing it for the prevention of hereditary disease and deformity, it is never likely in civilised life to be substituted for the imperfect restraint of moral force.

Our modern surgery has shown what can be legitimately accomplished in the way of extirpating ovarian cysts, and with what results. Without this no one would have thought of treating functional diseases of the ovaries by the same surgical operation. Battey proposed and did so when he castrated a young woman in 1872, acting, as there is reason to believe, independently of any acquaintance with the suggestion made by Blundell in a paper read before the Medical and Chirugical Society in 1823, in which he said that 'extirpation of the ovaries would probably be found an effectual remedy in the worst cases of dysmenorrhæa and in bleeding from monthly determination in the inverted womb where the extirpation of that organ was rejected.' Though the procedure had about it at first sight an air of plausibility, it was as a piece of surgery about on a par with amputating for an aneurism. He had to deal with organs supposed to be at fault and to prevent the mischief they were causing. Two alternatives were at his choice; he could either cut out the ovaries, or he could try to bring about their atrophy. He took the first, and nothing in what he has said or written shows that he ever thought the second possible.

When Bell snipped out a length of nerve, or when the surgeons of to-day have stretched a nerve to stop a neuralgic pain, a well-known principle guided them. So it was with Hunter, when he tied the femoral artery to cure disease of the popliteal. And nature herself has recourse to the same device in twisting the pedicle of an ovarian tumour. But it is not always so easy as it might seem to carry out scientific principles in surgical practice. No one had tied the spermatic artery, and no one had cut or stretched the spermatic nerve, and Battey cautiously withheld his hand from such experimental practice. Ovariotomists had shown him what was within his power, and he elected to try that which was possible and easy. So the science of the nineteenth century has had for a time to give place to the rude chirurgical art of the seventeenth. Other surgeons have accepted this position, and, showing the human tendency to revert to barbarism, have repeatedly done the operation of extirpating the ovaries of women.

Battey's object was to bring about premature old age in women who suffer from the malperformance of their peculiar monthly functions; but others, as Hegar, have both before and since given a wider range to the idea of suspending the functions and influence of the ovaries. They remove them to stop the growth of uterine fibroma or myoma, and thereby lessen their hæmorrhagic tendencies. I find in Emmet's Gynæcology a summary by Dr. Paul St. Mundé, of what has been done in this direction: 'Adding to 51 previously reported cases with 16 deaths, these 42 of Hegar with 7 deaths; 16 by Freund, Schroeder, Langenbeck, Martin, Müller, and Czerny, with but 2 deaths; 10 by Noeggerath (unpublished), 2 deaths; 1 by Goodell, fatal; and 1 by Battey, recovery (unpublished); we have 120 cases of Battey's operation, with 28 deaths, or 22·6 mortality.' Dr. Emmet adds two cases, one by Dr. Thomas temporarily benefited, the other by Peaslee dying.

My own experience is confined to three cases. The good effected may be judged by the fact that the first patient, who was operated on in January 1878, has written to me recently expressing her gratitude for the relief she has obtained.

The second is also grateful. But this and the third operations were so recently done that it would be premature to say anything about the result, although the large uterine tumour

which led to the removal of both ovaries in the third case is certainly smaller than it was before the operation.

Though I accept the principle, I see that the operation has a very limited application, and is so open to abuse that its introduction in mental and neurotic cases is only to be thought of after long trials of other tentative measures and the deliberate sanction of experienced practitioners. Mortal diseases admit of mutilating and desperate remedies. But mutilation for the sake of terminable maladies, which are the fruits of a vicious civilization or a reckless procreation, is rather a question for the moralist than the surgeon. In the case of fibroid growths, with much bleeding, the position is not the same. There life is threatened, the danger constantly increasing, and the last resource the very serious operation of amputation of the tumour or of the uterus. If it can be proved that the annulment of ovarian function, even at the cost of the organs, arrests the development of the uterine growth, or holds in check its bleeding propensities, then the surgeon might rightfully remove the ovaries. But that the conditions justifying such an operation are exceedingly rare is evident from the fact that, since his first enunciation of the principle upon which he proposed to act, at the date of the London meeting of the International Medical Congress, Battey had only found fifteen cases in which he could see reason for carrying it into practice; and during the four or five years that the subject has been under my consideration I have only met with four patients to whom I could recommend the operation. One of these still refuses the chance of relief from surgery and prefers waiting to see what may happen from natural causes. My last operation of the kind was done after consultation with Dr. Priestley as the alternative for extirpation of an enlarged uterus in a young lady who suffered most severely and whose health was giving way to such an extent that any remedy seemed preferable to letting things go on, or trusting to ordinary measures. After making an exploratory incision, extirpation of the ovaries appeared to present the fewer difficulties and to offer the best chance of safety to the patient. And it was done. What the result may be after convalescence remains to be seen. This was a case in which I was following out Hegar's idea. The other two opera-

tions were purely Battey's. The first of these was very fully reported in the Transactions of the American Gynæcological Society for 1880, vol. iv. The patient was in her fiftieth year and had never been pregnant, if we except a doubtful abortion of about two months, two years after marriage, the result of a carriage accident. Her history was that of fourteen years' almost intolerable suffering, with every kind of experimental treatment suggested by the various hypothetical guesses as to the cause of the distress. Apart, however, from all surmises, there was the fact of the absolute association of severe suffering with pre-menstrual congestion, justifying the belief that ovariotomy performed with the view of anticipating the climacteric would be a legitimate proceeding. We had deferred the operation in the hope that at the age of forty-nine the catamenia would cease naturally. But a sister aged fifty-four was still menstruating quite regularly; and the patient felt that it would be quite impossible for her to go through four or five years more of such repeated suffering. After full consideration therefore, with Dr. Frank, and with the distinguished retired physician Dr. C. J. B. Williams, an old friend of the family, the operation was done.

Both ovaries were removed and are now preserved in the Royal College of Surgeons. The patient was very grateful for the relief afforded her, although she still has to wear a truss for a ventral hernia. I saw her in July 1881 quite well, there having been no return of catamenia since April 1880. Their recurrence after the operation is explained by the difficulty I had in removing every fragment of the left ovary. I may quote here the conclusion which I drew from a consideration of this case, and submitted to my medical brethren in these words: 'If I meet with what I believe to be a suitable case, and a willing patient, I shall certainly do this operation again; removing both ovaries and being especially careful that every fragment of both ovaries is entirely removed. I should operate rather through the abdominal wall than by the vagina; and be prepared for the probability of intestines being wounded when dividing the peritoneum. In uniting the edges of the wound, I should place the sutures nearer to each other than is usual in ordinary ovariotomy, in order to guard against the occurrence of a ventral hernia.' I still adhere to these con-

clusions. I think it would be only in an exceptional case, where an ovary could be felt low down between the vagina and the rectum, that a surgeon would now do oöphorectomy through the vagina. In almost all cases the abdominal operation would be preferred, and a word of caution is necessary to any one about to perform it under the impression that it is very facile in execution; for it is more difficult than ordinary ovariotomy. It is not so easy to divide the peritoneum without injury to the intestines. They have a greater tendency to protrusion and cannot be replaced readily after they have protruded. The opening into the abdomen should be made large enough to admit two fingers. With these the uterus is to be felt; one finger being in front of the fundus and one behind it. Then, by carrying them outwards, first on one side and then on the other, an ovary is felt and may be brought up outside the abdominal wall. Its connections with the uterus are transfixed and tied in two parts with a silk ligature; a third ligature being placed behind the other two. The ends of all must be snipped off close to the knots, and the ovary cut away not too near the ligatures, which are then allowed to slip down into the pelvis. It is not yet decided if the fimbriæ and part of the Fallopian tube had better be removed with the ovary. If not quite healthy, they should certainly be removed. After the second ovary has been removed, the wound must be closed as usual after ovariotomy, but with the sutures nearer to each other, to obviate the greater tendency of omentum or intestines to separate the lips of the incision. The tension is always greater in these cases than after removing large ovarian tumours, where the integuments have been a long time on the stretch. The dressing and after treatment should be precisely the same as for a case of ovariotomy.

Between January 1878, the date of this first case, and November 1881, or nearly four years, I did not repeat this operation, and I had only advised it in one case, that lady not being willing to submit to it. The lady on whom I operated in November 1881 was a widow, thirty-seven years of age, a patient of Mr. Waters, of Jermyn Street. She had suffered excessively for about eighteen months from the pressure of a hard pelvic tumour, which obstructed the rectum and caused great agony and danger at each catamenial period. At the

operation the tumour was found to consist partly of the right ovary, not much enlarged, and partly of the thickened and retroflexed fundus uteri, which I was able, but with great difficulty, to draw up above the brim of the pelvis. I removed the right ovary; the left was atrophied, and so closely applied to the side of the uterus that I could not distinguish its outlines, and did not disturb it. The patient made a recovery without any fever, and in January 1882 was quite well, having had two menstrual periods since the operation, at three weeks' interval, without any inconvenience. Here, of course, it is doubtful how far the relief is due to removal of one ovary, or to the reposition of the displaced uterus.

I have already stated that in the third case, although convalescence is established and the patient has returned home with the uterus diminishing in size, nothing can yet be said as to the result. But I cannot conclude this chapter without a word of caution against the extreme frequency with which the operation has been resorted to in this country, and at which Dr. Battey publicly expressed his astonishment, at the meeting of the Medical Congress in August last. Many cases where the symptoms have been described as sleeplessness, hysteria, nerve prostration, dysmenorrhæa or 'neurasthenic disorder,' have led to Battey's operation, and in the majority of such cases healthy ovaries have been removed. These are just the cases in which Dr. Weir Mitchell's systematic treatment, so successfully followed in this country by Dr. Playfair, should surely have been tried. Dr. Playfair says, 'If a case is purely neurasthenic it cannot under any conditions, I apprehend, be one even for the consideration of oöphorectomy. If, on the other hand, there exist those chronic organic changes in the ovaries which afford the most justifiable ground for this operation, any attempt at their cure by this treatment will inevitably fail.' Except in cases where bleeding fibroids may call for the removal of the healthy ovaries, we might at least require some evidence of the ovaries being diseased before consenting to their extirpation in the hope of curing any of those vague nervous disorders to which women are so subject, which are often dispelled by moral treatment or social changes, often benefited by measures which can have but little effect except on the imagination, often return after apparent cure in any way, and leave the hapless beings

the prey of unscrupulous or illogically enthusiastic experimenters.

In a paper read at the Medical and Chirurgical Society in January 1882, on hernia of the ovary, Dr. Barnes contended that this condition furnishes a legitimate motive for Battey's operation. He related a case in which an ovary, accompanying a hernia in the left groin, had been removed from one of his patients in St. George's Hospital. In the discussion which followed Mr. Hulke alluded to the comparative frequency of this form of hernia, and cited a case, under the care of Mr. Lawson some years ago, in which the suffering was so great that at the wish of the patient the organ was extirpated. Mr. Langton also showed, from his own experience of twenty years at the Truss Society, that out of 4,084 cases of inguinal hernia no less than 67 were instances of these displaced ovaries. Forty-two of the 67 were congenital, and 25 acquired. Those which were congenital were generally double, most of them were irreducible, and the effects with regard to the menstrual periods varied very much. Dr. Barnes attributed the larger number, being on the left side, to the greater length and laxity of the left round ligament, and the greater depth of Douglas's pouch on the left than on the right side; and said that in this way other pathological conditions more frequently observed on the left than on the right side, such as hæmatocele, might be accounted for. He was of opinion that where there was pain and distress it was better to remove the hernial ovary, which was liable to become inflamed and diseased, while trusses were apt to cause distress.

It is somewhat curious that in all my practice I have never met with a case of hernia of the ovary.

The last reports which I have respecting Battey's operation are those to be found in Professor Agnew's 'Surgery,' published recently in Philadelphia. He there mentions 107 cases, of which 88 were complete double operations. Sixty-seven recovered, and 21 died, a mortality of 23·86 per cent. In all he gives the figures of 171 cases; 144 by abdominal section with a loss of 27, and 27 vaginal, of which 5 died.

While revising the proof of this sheet I received the 'Ingleby Lectures for 1881,' by Dr. Savage, of Birmingham. He says that while Battey, from all the information he could obtain, found

the mortality to be about 18 per cent., in his own (Dr. Savage's) practice he has 'had 40 complete cases, with a result that all have recovered from the operation, and I believe that nearly every one has been cured of the disorder for which the operation was undertaken' (p. 33). Dr. Savage removes both ovary and Fallopian tube, but he appears to agree with me in the impression that ligature of the spermatic artery has more to do with the cessation of menstruation after operation than the removal of the tube itself.

CHAPTER XVI.

RESULTS OF OVARIOTOMY, AND SUBSEQUENT HISTORY OF PATIENTS WHO RECOVERED

The fact that of 1,000 women who have had one or both ovaries removed by me, 768 have recovered from the operation, is alone sufficient to justify the principle of the operation, and to prove that the mortality—namely, 23·2 per cent. on the whole thousand, but which has fallen from 34 in the first hundred to 11 in the last—is smaller than that of many capital operations which are constantly performed without hesitation in suitable cases. And when we consider that a patient from whom one ovary has been removed can scarcely be said to be mutilated, as she is perfectly capable of fulfilling all the duties of a wife and mother, menstruating regularly, and bearing children of both sexes, without any unusual suffering either during pregnancy or labour, all doubt as to the 'legitimacy' of ovariotomy must be at an end. And the operation ought to be accepted as a more certain means of saving life from threatened death, restoring the sufferer to perfect health, and rendering her more apt for all the requirements of daily life, than in the case of a patient who recovers after almost any other surgical operation.

Fears had been expressed that when a patient recovered after ovariotomy she would in some way or other suffer in after life, that she would not menstruate regularly, that, if she married, she would not have children, or children of only one sex, that she would become excessively fat, or lose her feminine appearance and her sexual instinct, or that her life might be shortened by some disease originating in the operation, or its consequences either upon some bodily organ or upon the mind. In order to ascertain how far any of these fears were well founded, or were exaggerated, or were purely imaginary and

destitute of foundation, I asked every patient who recovered to write to me once every year, on the anniversary of the operation, giving me full information as to her state. Nearly all promised compliance, and a few have written several years in succession. Many have written once or twice, some I have occasionally seen; but there were so many of whom I could obtain no information that in May and June 1872, and at the latter end of 1881, I sent a circular to every patient who had recovered after ovariotomy in my practice, or to the medical friend by whom she was sent to me, asking for information on the following points, and in this form:—

Name of Patient.
Date of operation.
Present state of health.
If married since—when?
Is husband still alive?
If any children—
    Date of Births.
    Sex of children.
Anything unusual in—
    Pregnancy,
    Or Labour.
If dead, cause and date of death.
Any other information connected with the operation or the Patient which may seem important.

*Signature*_____

*Date*_____

From circulars returned to me, and from other sources, I am able to say that of the 1,000 women who have submitted to ovariotomy by me between February 1858 and June 1880:—

449 have reported themselves well in 1881.
11 were well in 1880 and have not been heard of since.
86 were well in 1872 and have since made no report.
55 have reported themselves well within the last ten years without answering my last letter in 1881.
50 have made no report of themselves since the operation.
651

Making 651 either alive or not known to be dead.
127 died after operation among the first 500.
105 died after operation among the second 500.
117 have died since recovering from the operation.

1,000

Of the 117 deaths since recovery from operation:—
29 have died without cause assigned.
43 have died of diseases of the brain, heart, or lungs, quite unconnected with the operation.
7 have died of diseases of the abdominal or pelvic organs.
32 have died of malignant disease of various parts.
6 have died of return of the ovarian disease.

117

Of the 1,000 women operated on:—
439 who were married at the time recovered from the operation.

70 of these have since given birth to 126 children.

36 have had one child	(1 stillborn)	=36
18 have had 2 children	(one twins stillborn)	=36
11 have had 3 „	(one twins)	=33
4 have had 4 „		=16
1 has had 5 „		= 5
		126

1 woman has had triplets.
4 women have been married a second time; one having two children by her second husband.
369 have remained sterile.

329 women unmarried at the time of operation recovered.
70 of these have since married.
1 woman has been married three times.
44 of these married women have given birth to 99 children.

18	married	women	have had 1	child	= 18 (1 stillborn)
11	„	„	2	children	= 22 (one twins)
10	„	„	3	„	= 30
2	„	„	5	„	= 10 (3 stillborn)
2	„	„	6	„	= 12
1	„	„	7	„	= 7
3	single	„	1	child	= 3
					102

Making a total of 228 children amongst 117 women.

Many in writing the report add that they are well and strong, or better than they have been for many years, or some such phrase, expressive of their complete restoration. A few complain of some trifling ailment, and 117 have died of various diseases, some connected, others not in any way connected, with the operation.

Case 713 was an old woman of 70, operated on in June 1875. Mr. Whitmarsh, of Hackney, reported that at the age of 72, a year and a half after operation, 'she feels quite young again—she has gained flesh wonderfully, and the breasts are developed like those of a young woman.' She was well in December 1876, but has not been heard of since.

I have not been able to trace any peculiarity in the subsequent condition of patients who have recovered after removal of both ovaries as compared with those from whom only one was removed, except that with only three exceptions there has not been menstruation after recovery. One young unmarried woman became very florid and stout; but I have seen nothing like the excessive corpulence anticipated by those whose expectations were based on the results of castrating domesticated animals. Dr. Jackson, of Sheffield, has favoured me with the particulars of a case where he removed both ovaries in 1868, from a married woman twenty-seven years of age. She had been married nine years, had menstruated regularly, but had had no children. She was rather thin, but healthy in appearance. The abdominal swelling had been observed about two years. Both ovaries were removed, and the patient recovered rapidly. 'At about the menstrual period, on three occasions,' writes Dr.

Jackson, 'she had pains in the back, headache, and bleeding from the nose. This ceased, and she has since at the periods had headache and hot flushes in the face, terminating in a smart attack of diarrhœa, after which she felt quite well. The sexual appetite was absolutely *nil* for about two years, but on questioning her lately she said it has slightly returned. She has gained weight since the operation, probably to the extent of four stones. She is in the enjoyment of perfect health.' I have ascertained from the husband or medical attendant of some of my own patients that sexual desire and gratification have certainly not been less than before operation. In some cases, where only one ovary was removed, desire had been increased. One husband told me that his wife had been remarkably cold before ovariotomy, but was afterwards extremely amorous. In several patients whose menstruation before operation had been painful and irregular, it became quite regular and normal afterwards. A few who had been married some years, but were childless, have had children since.

To the best of my knowledge and belief this is the first time that any such extended inquiry into the subsequent history of patients who have recovered from a capital operation has been carried out. As a rule, in all statistical returns from hospitals, the bare fact of death or recovery is all the information that is given, and any attempt to follow up the successful cases afterwards is found to be excessively difficult. Some years ago, I endeavoured to ascertain what became of patients who recovered after amputation of the thigh. I had good reason for believing that many died within a year, but was never able to obtain anything like correct statistical information. The hospital reporters of the 'Lancet' once collected together particulars of all the cases in which amputation at the hip-joint had been performed for several years in London hospitals. A large proportion of the patients died within a day or two of the operation, and of those who recovered the only one who was alive a year after operation was a woman whose thigh I removed at the hip-joint, in the Samaritan hospital, on account of malignant disease. It is well known that patients who have been cured of aneurism, either by ligature or compression, are very apt to suffer from the disease in some other artery, but it is left to some future

inquirer to ascertain the frequency and date of such return of disease. We have a little more information as to patients who undergo lithotomy a second time, but most of the information ends with the immediate result of the operation, and but little is known of the subsequent history of the patient. I hope that what has been done in this respect with regard to ovariotomy will not only be useful in enabling us to form a correct estimate as to the value of this operation, but will induce other surgeons to obtain similar information as to the subsequent history of patients who recover after amputation of a limb, excision of a large joint, lithotomy or lithotrity, ligature of main arteries, herniotomy, or trephining.

When a surgeon has removed a large diseased ovary and the woman recovers, he has in very many cases the great satisfaction of feeling that his patient has been restored to perfect health. Experience has proved that the remaining ovary generally carries on its functions, and that the woman may become the mother of healthy children of both sexes. The patient is not mutilated as by the amputation of a limb, nor does the general health suffer as it frequently does after the greater amputations. There certainly is nothing like the tendency to recurrence which there is after the removal of malignant tumours, probably by no means so frequent occurrence of disease elsewhere as after successful ligature of a diseased artery, or disease of the opposite lens after successful removal of one cataract, or formation of a second calculus after a removal of one by lithotomy or lithotrity; and certainly no such prolonged suffering as the chronic cystitis which not unfrequently follows these operations.

The rule is that by a successful ovariotomy the patient is restored to a state of health so perfect that she and her friends are as surprised as they are gratified. But there are exceptions to this rule. In some cases a disease believed to be innocent proves to be malignant, soon recurs, and proves fatal within a few months, or even within a few weeks after apparent recovery. In other cases the ovary which is left untouched because it is believed to be healthy, or so slightly diseased that its removal is uncalled for, becomes the seat of disease. In what proportion of cases this occurs we have even now but little more information than may be found in this volume. It

is only within the last fifteen years that ovariotomy has been performed sufficiently often to furnish data for reliable statistics, and it is difficult to ascertain, even in some of these later cases, what has been the state of the patient's health a few years after operation. But it would be unreasonable to expect that in all cases the ovary left in the body would remain healthy. It is for future observation to decide how often and in what class of cases a recurrence of disease may be feared. The fact that in my practice there were 11 recurrences requiring a second operation out of 1,073 patients, gives a proportion of one in about every 97 cases, and, so far as I can make out, the character of the cysts was generally *proliferous*; at any rate, it was so in almost all the cases in which an accurate report has been kept of the character of the tumours. It is satisfactory, however, to learn that if the remaining ovary should become diseased, the first operation need not add to the difficulty of a second, and that when a second ovariotomy has been performed it has proved successful in eleven out of the thirteen cases in which I have operated, and in the case in which Dr. Atlee operated sixteen years after the first operation by Dr. Clay.

These rare exceptions to the general rule of complete restoration of perfect health cannot be considered as invalidating the claim of ovariotomy to be considered as one of the greatest of surgical triumphs—relieving suffering, saving life, restoring the dying woman to perfect health, and enabling her to fulfil all the duties of a wife and mother.

CHAPTER XVII.

ON UTERINE TUMOURS

The Diagnosis of Uterine from Ovarian Tumours is a difficulty which frequently arises in practice, which may often be solved with great ease, which as often requires much cautious investigation, and which in some cases can only be cleared up by an exploratory incision.

It is only since ovariotomy has become a familiar operation that the fact of uterine tumours frequently attaining a very large size has become generally known. Even now I am often told by men of great experience that a tumour must be ovarian because it is too large to be uterine. They have never seen nor heard of any such enlargement of the uterus, and are astonished when I say that the largest abdominal tumours I have ever seen have been fibroid or fibro-cystic tumours of the uterus.

In one of the earliest attempts to perform ovariotomy in Great Britain, in 1825, Mr. Lizars fell into this error of diagnosis. He opened the abdomen and found a large uterine tumour. And the first tumour supposed to be ovarian which was removed in London—by Dr. Granville, in 1827—proved to be a fibroid tumour of the uterus, weighing eight pounds. Of the eight first published cases by Kœberlé of removal of uterine tumours by gastrotomy, in only three was the diagnosis of uterine tumour made accurately before operation. In two the diagnosis was doubtful, and in three the tumour was believed to be ovarian. In fact it has happened to many surgeons, and to myself among the number, that we have commenced operations as ovariotomy, and even removed tumours from the abdomen, under the impression that we were dealing with diseased ovaries, when, upon examination, they have proved to be pedunculate fibroid outgrowths from the uterus.

In my first work on 'Diseases of the Ovaries,' published in 1865, I have recorded cases where I removed large uterine tumours containing solid fibroid masses many pounds in weight, and cyst-like cavities containing more than twenty pints of fluid, these tumours being so far pedunculated outgrowths from the peritoneal surface of the uterus that the mobility of the cervix uteri was free, and no enlargement of the uterine cavity could be detected by the sound.

It is quite certain, therefore, that both uterine and ovarian tumours may lead to very great enlargement of the abdomen, and I can add from my own experience that the tumours may be central in position, or inclined to one or other side; either round, ovoid, or irregular in form; smooth or lobulated on their surface; either hard, or elastic, or fluctuating; either tender or insensible to pressure; and either adhering to the abdominal wall or moving beneath it with or without crepitation.

It is also certain that there is nothing in the *history* of a doubtful case which affords any very decisive assistance in diagnosis; for although the increase of ovarian tumours is often rapid, it is almost as often slow; and if the increase of uterine tumours is generally slow, it is not unfrequently rapid. Uterine hæmorrhage, either in the form of excessive menstruation or of flooding at irregular intervals, is certainly more common in uterine than in ovarian tumours, but is occasionally associated with the latter. Probably the rule is that menstruation is scanty when a tumour is ovarian, and excessive when it is uterine, but exceptions to this rule are numerous; and discharges of albuminoid fluids from the vagina at variable intervals are common in both classes of tumours.

So with the *age* of the patient. Perhaps uterine may be more common than ovarian tumours in old persons, and ovarian more common than uterine tumours in young persons; but it is certain that both uterine and ovarian tumours are common in single, married, and widowed women at all ages after puberty, and in all conditions of life.

They are also observed in some women who are extremely fat, in some who are otherwise healthy and well-nourished, and in some who are extremely emaciated; and there is a facial expression common to women suffering from both classes of

tumours, associated commonly with a very florid complexion when the tumour is uterine. In the majority of ovarian cases the complexion is pallid; but in some cases, where the patient is fat or well-nourished, the complexion may be florid.

Remembering the numerous exceptions to all the rules just stated, we may now inquire what may be learned by the eye, the touch, and the ear, in an examination of the abdomen; in other words, what are the signs afforded by inspection and measurement, by palpation, and by percussion and auscultation, which are of value in diagnosis. The results of this inquiry may be arranged in the following order:—

Inspection

1. Visible enlargement of the abdomen is more often *general* in cases of ovarian tumour, and *partial* in cases of uterine tumour, being confined to the lower part of the abdomen until a very large size has been attained.

2. The depression of the umbilicus is diminished, or the umbilicus may become prominent in large ovarian cysts. This is rarely seen in uterine tumours unless fluid is also present in the peritoneal cavity.

3. Enlargement of the superficial veins of the abdominal wall, and œdema of the abdominal wall and of the lineæ albicantes, are more general in uterine than in ovarian tumours of moderate size, but are not uncommon when ovarian tumours have attained a very large size.

4. When the abdominal wall is thin, both uterine and ovarian tumours, if not very closely adherent to the abdominal wall, may be seen to move downwards as a recumbent patient inspires, and upwards during expiration, falling downwards and forwards as she sits or stands, and more or less to either side according to the inclination of her body. But nearly all uterine tumours, though visibly moving above, seem to be fixed below in the hypogastric region.

5. When a recumbent patient attempts to sit up without aid from any other than the abdominal muscles, the recti are seen to bulge forward in front of a tense non-adherent ovarian tumour or with a flaccid adherent cyst. This is seldom well marked in uterine tumours, a solid mass fixed centrally

below the umbilicus interfering with the free action of the recti.

Measurement.

6. Increase in the circular measurement of the abdomen is usually greater on one side than the other in ovarian tumours. In uterine tumours the increase is more often symmetrical. In both classes, vertical measurement shows the distance between the pubes and the sternum to be increased. But very great proportionate increase of the space from the pubes to the umbilicus is more common in uterine than in ovarian tumours.

Palpation.

7. Large masses of apparently solid matter, and smaller masses or nodules of very hard or bone-like substance, are sometimes observed in ovarian tumours. But it is excessively rare to find such solid portions *preponderating* in an ovarian tumour. As a rule, the fluid or cystic portion is the larger, the hard or solid portion the smaller, in ovarian tumours. In uterine tumours, on the contrary, the solid is the larger, the fluid the smaller, portion.

8. The mobility of ovarian tumours is generally greater from below upwards than that of uterine tumours, unless the latter are distinctly pedunculated. If one hand be pressed backwards between the tumour and the pubes, an ovarian tumour can generally be raised considerably, and the hand can sometimes be pressed backwards almost to the brim of the pelvis; while a tumour which involves the body and neck of the uterus cannot be raised at all, or only with difficulty, and the hand cannot be pressed down between the pubes and the tumour.

9. When there is fluid free in the peritoneal cavity, and a hard tumour can be felt on displacing this fluid by sudden pressure, the tumour may be either uterine or ovarian. If the tumour be very hard and the quantity of fluid small, the tumour is probably uterine and the fluid ascitic. An ovarian tumour which has given way, and emptied one or more of its cysts into the peritoneal cavity, is seldom hard or well-defined in outline, and the quantity of fluid is often so large that the size and

shape of the tumour cannot be ascertained until after removal of the fluid by tapping. The characters of the fluid will then complete the diagnosis.

Percussion.

10. As percussion elicits a dull sound all over both uterine and ovarian tumours, which dulness ceases abruptly at the border or outline of the tumour in all positions of the patient—except in the rare cases where a cyst contains gas, or where a coil of intestine is adherent in front of a tumour—percussion cannot afford much aid in distinguishing ovarian from uterine tumours.

Auscultation.

11. In ovarian tumours the impulse from the aorta is often perceptible, and a sound sometimes accompanies the impulse. The sounds of the heart are rarely transmitted, and any distinct vascular murmur is excessively rare. But in about half the cases of uterine tumours which I have examined some variety of vascular murmur may be heard. In some cases the murmur is tubular, in others vesicular, and sometimes a tubular and a vesicular murmur may be heard in different parts of a uterine tumour. These murmurs are synchronous with the pulse. They may vary in intensity with the amount of pressure by the stethoscope, and may disappear on very firm pressure. Common in uterine, very rare in ovarian tumours, vascular murmurs are valuable aids in diagnosis.

Having thoroughly examined the abdomen, the pelvis is next to be examined by the vagina and rectum, and a conjoined examination of the tumour by the abdomen and pelvis should also be made.

Examination of the vagina may at once remove all doubt, by showing that the os and cervix uteri are in a healthy state, that the uterus is normally mobile, that its cavity is neither elongated nor shortened, and that any tumour felt through the vaginal wall is independent of the uterus. In such a case the tumour is almost certainly ovarian. On the contrary, we may find the vagina more or less completely obliterated by a solid mass, the

cervix uteri gone, the os reached with difficulty, the cervical canal so closed or distorted that the sound cannot be passed, or the uterine cavity so enlarged that the sound may pass many inches beyond the normal length. Here the tumour is almost certainly uterine.

But it must be remembered that considerable peritoneal outgrowths, or large growths within the walls of the fundus or body of the uterus, have been observed, while the uterine cavity has remained unaltered in dimensions and the cervix in structure. And, on the other hand, the cervix may be drawn up out of reach, or the whole uterus may be elongated, when the connection with an ovarian tumour is close; or the lower portion of an ovarian tumour may be so moulded to the true pelvis that the uterus is pressed upwards and forwards, or flattened behind the pubes, so that the tumour and the uterus are either really or apparently inseparable from one another. Abnormal arterial impulse in the vagina and cervix uteri may be felt in both classes of tumours. In one case I found during the operation that the pulsations at the base of a uterine tumour arose from some large vessels in a portion of omentum which had contracted adhesions low down. The pulsating omental vessels had been felt through the vagina. But I have never felt the vascular thrill like that of varicose aneurism, occasionally felt in the lower segment of a fibroid uterus, in any ovarian tumour.

In reading this sentence it must be borne in mind that it forms part of a paragraph on the differential diagnosis of uterine and ovarian tumours, and must therefore be taken as indicating the simulation of aneurismal disease by some conditions of fibroid uterus as a point of difference between them and ovarian cysts, as well as the mere fact itself. In 1876 Dr. Bailey, of Louisville, Kentucky, furnished me with not only a marked instance of this condition, but a curious exemplification of the ease with which even intelligent and dispassionate commentators may put different interpretations upon the simplest bit of text when they overlook the context. In consultation with other eminent practitioners, he had seen a patient who for eight or ten years had had fibroid tumours of the uterus, and he wrote to me thus: 'Latterly a new feature occurred in the case. All the phenomena of an aneurism

appeared in the lower segment of the uterus. A purring thrill could be heard and felt very distinctly indeed. Several very prominent gynæcologists unhesitatingly pronounced it aneurism. Upon the paragraph quoted from your work I stated that you taught that the phenomena of varicose aneurism occurred in the lower segments of fibroid uteri without there being aneurism. Did I interpret your language correctly? Dr. Atlee, of Philadelphia, as well as the other eminent gentlemen, maintained that you merely expressed the idea that fibroid uteri had a pulsatory thrill in their lower segments that was not found when the tumours were ovarian. Now while this is true, I claimed that your language taught more than this, namely, that the lower segments of fibroid uteri occasionally gave out all the phenomena of varicose aneurism when there was no aneurism, and that this was not the case with ovarian tumours.

'Dr. Atlee performed gastrotomy on the 28th inst., and as the shock and loss of blood lost to him the patient upon the table, the dissection of the tissues where the aneurismal phenomena had presented themselves demonstrated no aneurism. So if I have interpreted your teachings aright they have in this case received additional support.'

In order to prevent any further misreading of my words, in which, however, I can see nothing equivocal when taken in their connection, I may notify that as I cannot reword the matter more clearly than he has done, I fully accept Dr. Bailey's construction, and gladly add his case as an illustration of my text.

The vaginal walls may be so depressed, when there is much fluid free in the peritoneal cavity surrounding either a uterine or an ovarian tumour, as to form a vaginal rectocele, more rarely a vaginal cystocele. And the uterus may either remain above the brim of the pelvis if greatly enlarged, or if fixed by adhesion; or it may prolapse with the vagina, the os appearing at the most depending part of the protrusion. Here the uterine sound will generally remove all doubt; for if the dimensions of the uterine cavity are normal, and the weight of the uterus is not increased, the tumour can hardly be uterine. And a uterus which is not much enlarged can generally be pushed up to its normal position.

In some cases where the uterus is much elevated, it may be felt through the abdominal wall above the pubes, while the os uteri cannot be reached by the vagina. The urethra may be elongated or drawn to one side, and the bladder may also be displaced. If the abdominal tumour and the pelvic portion of the tumour fluctuate, while the uterus does not much exceed its normal dimensions, it is almost certain that the uterus is adherent to, and is elevated by, an ovarian tumour.

Examination by the rectum may show that the uterus preserves its normal size, shape, and position. Or it may be displaced by some tumour above or in front of it, and one or both ovaries may sometimes be felt. This, however, is not very common if they are not enlarged nor lower in the pelvis than usual. By one finger in the rectum and another in the vagina, the consistence, form, and size of any intervening structure can be ascertained and valuable information so obtained. And if the sound be passed into the uterine cavity, and examination then made by the rectum, it is often easy to ascertain whether any solid or fluid tumour is situated between a normal uterus and the rectum, or whether the uterus is fixed and its posterior part enlarged.

When a tumour can be felt in the pelvis by vagina and rectum, as well as in the abdomen by the abdominal wall, simultaneous examination will be required to ascertain if there is more than one tumour, and if the uterus is independent or not. Pressing one finger firmly on the cervix uteri, and moving the abdominal tumour with the other hand from side to side, then upwards and downwards, the uterus may be felt to remain almost unaffected by the movements of the tumour, or only to receive some transmitted movement as the pelvic portion of the tumour moves. Here the strong probability is that the tumour is ovarian. On the other hand, every movement of the abdominal tumour may be communicated immediately to the uterus, which is felt to move in all directions with the pelvic portion of the tumour. If this portion is solid, it is almost certain that the tumour is uterine.

Cases are sometimes met with where ovarian tumours and fibroid tumours of the uterus are both present at the same time. Small uterine fibroids are often observed when the only important tumour is ovarian. I have seen a large cyst of one

ovary and a large uterine fibroid coexisting. I have twice seen tumours of both ovaries present when the uterus was enlarged by fibroids, and several cases where both uterus and ovaries were simultaneously affected by malignant disease. In Case 979, a patient of Sir Risdon Bennett's, I removed an ovarian tumour weighing seven pounds, and a fibroid outgrowth from the uterus weighing two pounds. And this year I removed a dermoid tumour of the left ovary, and a fibroid outgrowth from the right side of the uterus. Both these patients were young unmarried ladies, and both recovered.

If these possible complications be borne in mind, such an examination as I have suggested will in most cases suffice to establish an accurate diagnosis between uterine and ovarian tumours. In some cases doubt may still remain, and exploratory puncture or incision will then be necessary.

The history of one patient whom I saw in 1862, in consultation with Dr. Madge, when the practical difficulties were supposed to be due to the presence of an ovarian cyst, shows how almost impossible it is under certain circumstances, even with the most experienced assistance, to form an absolutely right opinion about these suspiciously situated fibroid tumours. The particulars were laid before the Obstetrical Society by Dr. Madge, and I quote portions of his report.

'Mrs. H., æt. 27, primipara, well-grown, in robust health, and who had gone her full time, was taken with slight labour pains on the morning of May 21. On making an examination in the after part of the day, I found the pelvis occupied by a large round tumour, which at first appeared to me to be the child's head. It seemed, however, to be lifting up, as it were, and pushing forwards the posterior wall of the vagina. It was low down, and came lower, but receding again, with every pain. It appeared to fill up every niche in the pelvis, so that the finger could not be passed around it. The os uteri could not be felt. Next day the tumour was occupying precisely the same position. The pains were still slight and not frequent, and, as the patient was in her usual health and spirits, it was considered advisable to wait. In the evening, with considerable difficulty, by hooking my finger high up behind the symphysis pubis, I was enabled to reach the os uteri; it was directed forwards, dilated to about the size of a crown piece, and, as well

as I could make out, some part of the breech presented. On the following day Dr. West, Mr. Spencer Wells, and Mr. Newton met me in consultation. Pains getting more frequent. As some parts of the tumour felt soft and yielding, a trocar was introduced, and a small portion of fluid drawn off. Vain attempts had been made previously to push the tumour above the brim of the pelvis. Chloroform having been administered, and the catheter used, the opening in the tumour was enlarged. Mr. Spencer Wells was then enabled to push the tumour upwards, and, with the aid of a blunt hook, the child was brought down by the buttock. When born it had some faint signs of life, but could not be made to breathe. In the early part of the following day the patient seemed to be doing well; as the day advanced, by fits and starts she became very excited, and could not be persuaded to lie still. Peritonitis set in in the afternoon, and she died on the third day after confinement.

'*Autopsy, eighteen hours after death.*—There was a little effused lymph; and underneath the viscera about a pint of bloody serum. The tumour was lying above and in a line with the uterus, nearly reaching by its upper border the epigastrium. It was attached to the posterior aspect of the fundus uteri by a long pedicle, and had thus been allowed to drop into the pelvis at or before the commencement of labour. The weight of the tumour was between one and two pounds, its diameter six inches and a half, and it consisted throughout of white fibrous tissue. Six small tumours, of the same character, were studded about the external surface of the uterus.'

On April 7, 1869, I exhibited at a meeting of the Obstetrical Society a fibroid outgrowth from the fundus uteri, weighing thirty-four pounds and ten ounces, which I had removed a few hours before from a single woman thirty-six years old. Eleven years before, half her lower jaw had been removed with a fibrous tumour by Mr. Pemberton of Birmingham. An abdominal tumour was discovered in 1864; it enlarged gradually, and she was twice in the Birmingham Hospital. During the last six months the tumour had increased rapidly, and she became very weak and lost flesh. On admission to the Samaritan Hospital a very large abdominal tumour could be felt, but it evidently contained no cyst large enough to warrant tapping, and did not feel so hard as a fibroid tumour of the

uterus. No vascular murmur was audible in it, and it appeared to move quite independently of a uterus of normal size. When the tumour was exposed I was surprised to find that it was not ovarian. It sprang from the posterior surface of the fundus uteri by a short pedicle, as shown in this drawing to scale by Dr. Junker, which represents the posterior surface of the uterus, with the Fallopian tubes, and both ovaries. A ruptured

Graafian vesicle is seen on the left ovary. The pedicle was secured by a clamp forceps and the tumour was cut away. Some bleeding spots where adhesions had been separated were secured by an acupressure needle, and the clamp was removed. Bleeding vessels were secured by hare-lip pins and twisted sutures, which also served to fix the bleeding surface to the abdominal wall by transfixion. The patient died on the third day after the operation, not from any bleeding, peritonitis, or other direct consequence of the operation, but from fibrinous deposit in the right side of the heart. Superfibrination of the blood had been feared from the first on account of the rise in the temperature of the body from 98·4° to 101° within twelve hours, and then rapidly upwards to 105·8°. This was accompanied by hurried breathing, and a feeble quick pulse, with scanty secretion of urine, charged with urates and pigments. The first sound of the heart became feeble more than twenty-four hours before death, and was inaudible for fully twelve hours. I observed at that time that in all operations where peritonitis may be expected, the direct effects are far less

serious than its tendency to cause excess of fibrine in the blood and separation of the fibrine in the heart; but at the present day we should refer the cause of death in this patient to septicæmia, and believe that it might have been averted by antiseptics.

Dr. Braxton Hicks reported of the tumour that 'it weighed thirty-four pounds ten ounces, was about 17 inches in diameter, of a nearly globular form, having five principal lobules on its upper aspect. These lobules were about three inches in diameter, and were partially pedunculated.

'The tension of the tumour varied throughout. It had a fluctuation very similar to that of an ovarian polycystic growth, which it also resembled much in appearance.

'The interior was found to be free from cysts, excepting a few of small size, of a false kind, formed by separation of the layers of the tissues, the largest not an inch in diameter, of irregular form. The tissue of which it was composed was arranged in a manner concentric with the true centre, except in the lobules, where it was arranged around their centre—differing from the irregularly concentric arrangement generally found in mural uterine fibroid growths. When cut into, serum exuded rather freely. The inside of the growth was of a pink, semi-translucent colour.

'The microscopical examination of the growth showed it to be composed of areolar wavy tissue, interlacing in all directions, but the arrangement of the fibres was very open, and between them the serum was held; very little, if any, true uterine fibres existed.'

I have quoted the above account of this case as published at the time. My present belief, founded on later experience, is that if the pedicle or connection with the fundus uteri had been treated either *intra*-peritoneally by ligature, or *extra*-peritoneally by a clamp, the result would have been better than by the combined method adopted of securing the stump to the abdominal wall.

The following case of fibro-cystic tumour of the uterus, with some remarks reprinted from the 'Dublin Quarterly Journal of Medical Science,' August 1864, independently of their practical importance, are historically interesting as a sort of landmark indicating one stage in the settling of the principles of our

diagnosis in these diseases, and the date at which it became generally known that fibro-cystic tumours of the uterus could contain so large a quantity of fluid as to bring them into diagnostic competition with ovarian cysts. It also served as a danger signal, marking the limits of safety in any operative proceedings undertaken either for determining the nature of the growth or the possibility of its removal.

On June 20, 1864, I arrived in Dublin, having been requested by Dr. Stokes to come prepared to operate in a case which he and Dr. Beatty considered did not admit of delay. I saw the patient at once with Dr. Stokes. She was a single lady, forty-five years of age, extremely emaciated, but in excellent spirits. Dr. Stokes had detected two apparently solid tumours in the abdomen ten years before. One appeared to be central, and a little above the umbilicus. The other to the right side, under the anterior superior spinous process of the ilium. They were then each about the size of a goose egg. Increase had been slow at first, and no alteration in dress had been called for until a year ago. During the past two months increase had been very rapid. The abdomen was enormously distended, measuring fifty-six inches in girth at the level of the umbilicus, nineteen inches from the ensiform cartilage to the umbilicus, sixteen from umbilicus to symphysis pubis, twenty-three from the right anterior superior spine of the ilium to the umbilicus, and nineteen inches from the same process on the left side to the umbilicus. The greater prominence on the right side was very visible; the skin covering the umbilicus was distended by fluid simulating an umbilical hernia. Above the umbilicus fluctuation was very evident; but the fluid was evidently free in the peritoneal cavity, and covered a solid or semi-solid tumour that could be felt on displacing the fluid by deep pressure. Some of the superficial abdominal veins were dilated, but were not varicose; the fluctuation below the umbilicus was very indistinct, and the tumour appeared to be adherent. Examination *per vaginam* showed the uterus was high, but central; the os virginal; the cervix absorbed or atrophied, and behind it a small portion of the tumour could be felt through the vaginal wall. The uterine sound passed to three and a half inches. Menstruation had passed off quite naturally early in June; but there had been no appearance for the previous six

months. Up to that time she had been quite regular. There was no history either of excess or deficiency. The left leg was slightly œdematous, and she had occasionally felt it weak and painful. She had never been tapped.

The diagnosis which I made and wrote down was: 'A quantity of fluid free in the peritoneal cavity above the umbilicus—ascitic or ovarian? Below the umbilicus a large attached multilocular cyst.' In consultation with Drs. Beatty, Gordon, and Stokes, it was agreed that I should tap above the umbilicus, and if the tumour appeared to be firmly adherent do no more; but if the tumour was not attached, to remove it. Accordingly, Mr. Macnamara having administered chloroform, and with the kind and able assistance of Drs. Beatty and Gordon, I tapped, with a very long trocar, above the umbilicus, and removed about thirty pints of clear rather viscid fluid. When all the fluid had escaped, the canula (which is fourteen inches long) was passed in all directions between the surface of the tumour and the abdominal wall, proving that there were no adhesions within reach. Fluctuation was also detected in different parts of the tumour. After removing the canula, and closing the small opening, I made an incision below the umbilicus about six inches long, and exposed what appeared to be two ovarian cysts separated by a deep fissure. I tapped that on the left side, and about ten pints of bloody serum escaped; two or three pints more of similar red fluid escaped after puncturing again within the cyst first opened, by pushing on the trocar without removing the canula. The tumour was then withdrawn, and found to have two attachments—one above to the tumour on the right side, and one below to the uterus. The former attachment was broken through, and two bleeding vessels on the torn surface of the right tumour were secured by silk ligatures. The left broad ligament was then transfixed, tied in two halves with strong silk, and the tumour was cut away. It then became a question what should be done with the tumour on the right side; and, looking to its great size, solidity, evident close connection with the transverse colon, and with the omentum which contained some enormously distended veins, it was decided, with the full concurrence of Drs. Beatty and Gordon and Mr. Macnamara, that no attempt to remove this tumour should be made,

especially as the patient was becoming very feeble. The wound was accordingly closed, and the patient placed in bed. She was extremely feeble, and brandy was administered freely; but she never rallied nor recovered consciousness, continued to sink, and died about three hours after she had begun to take chloroform.

The tumour which I removed was examined by the late Dr. Ritchie, and I published his very accurate report of it fully. It is now only necessary to say that it weighed about twenty pounds, and was almost entirely solid. Its greatest length was 18 inches; breadth, 12 inches; thickness, 7·8 inches.

On making a longitudinal section the tumour was found to consist of fibrous tissue, arranged in different fashions and in different states of perfection, and split up by little cavities of various sizes, containing serum more or less transparent. The solid tissue was everywhere permeated by large blood-vessels, and in several places blood cysts, the size of a barley-corn to that of a pea, were demonstrated. The largest cyst was at the superior extremity; it was about the size of an adult head, and its internal surface presented traces of having primarily been divided into several compartments.

The body was examined after death by Dr. Gordon, and the following is a description of the tumour which we did not attempt to remove: It consisted partly of a cyst and partly of a fibro-cystic tumour. The cyst was spherical, about a foot in diameter, empty (its contents having escaped through a smooth-margined opening, an inch in length), and it adhered to the anterior abdominal wall. The inferior border of the cyst was further attached to the transverse colon by strong adhesions, in which were found several large blood-vessels and some lymphatic glands; two of the latter being enlarged and infiltrated with tubercle.

A part of the omentum was attached to the colon, and in it the veins were enormously distended and much convoluted. They were full of air, and resembled rather the small intestines of a fowl or of a rabbit than the blood-vessels of a human being.

On examining the uterus and the enormous fibro-cystic tumour which was springing from its fundus, the vaginal portion of the uterus was found to be altogether atrophied—the

vagina terminating in a virginal os uteri; and the sensation conveyed to the finger was that of a very light movable uterus. On looking for the body of womb, its place was found to be occupied by a long flexible tube, crackling under pressure, like thick parchment. From the upper, somewhat dilated, extremity of this tube, sprang the right Fallopian tube and the right ovarian ligament. This was in normal relation to the right ovary, which also appeared healthy. The vagina and the elongated uterus were now slit open, and the length of the entire cavity of the womb was found to be 7 inches, that of the cervix alone $3\frac{3}{4}$ inches. The greatest width of the uterine cavity was close to the fundus, and did not exceed $\frac{3}{4}$ of an inch. The left Fallopian tube had been cut through half an inch from its uterine extremity.

The walls of the uterus, like the Fallopian tube, were of normal thickness. From the fundus sprang a fibrous column, 5 inches long, 3 inches deep, and $1\frac{1}{2}$ inch broad, encircled at its upper extremity by a ligature. The left side of this fibrous column presented a roughly cut surface, 5 inches long and 3 inches broad or deep, being the point at which the tumour first described had been cut through at the operation. The tumour which was left was an enormous mass, 18 inches in length, 16 inches in breadth, and near its centre fully 7 inches thick. The lower two-thirds of the tumour were separated by a deep sulcus from its upper third, so that the two bodies appeared distinctly separate. The upper tumour was 11 inches broad by 6 inches long, and 6 inches in depth; its general shape strongly suggestive of an enlarged liver. In structure the tumour was precisely similar to the one removed by operation, and described by Dr. Ritchie.

'In the fourteenth volume of the "Transactions of the Pathological Society of London," p. 204, may be found a short account of a fibro-cystic tumour of the uterus which I removed from a single lady, aged fifty-three, on April 30, 1863. 'One large cyst had held 26 pints of fluid and 4 pounds of fibrine; and a solid mass, which weighed more than 16 pounds, resembled very closely the mass just described by Dr. Ritchie. The patient sank, from shock, four hours after operation, although the tumour was completely removed; and there was so little difference in the pedicle from that often seen in ovariotomy

that it was not until after post-mortem examination that the true nature of the case was discovered. Given, a large semi-solid tumour, fluctuating in some parts, containing cysts holding upwards of twenty pints of fluid, moving beneath the abdominal wall, the uterus being movable, and not enlarged so far as measurement by the sound can detect, no sound or arterial impulse to be heard which is not often heard in ovarian tumours, and no history of hæmorrhage leading to a suspicion of uterine disease—and it will be admitted that these characters of the two fibro-cystic tumours of the uterus which I removed so closely resemble those of semi-solid ovarian tumours, that diagnosis must be very uncertain. Even after an exploratory incision, I know of nothing but a rather darker—less pearly blue—aspect of the tumour which would put the surgeon on his guard. In any doubtful case it would be well to tap the largest cyst and examine the fluid. In both my cases this was peculiar—not the viscid mucoid fluid of multilocular ovarian cysts, but a thin serum, with five, ten, or fifteen per cent. of blood intimately mixed with it, and not separating until after standing for some hours. In this way I have satisfied myself, in at least four cases, that tumours, which others considered to be ovarian, were really fibro-cystic uterine growths. If the operation has been commenced, and the dark aspect of the tumour is observed, it would certainly be advisable not to do more than tap one or more of the largest cysts before examining attentively the connections between the uterus and the tumour. If these should prove to be very intimate, it will be the unpleasant duty of the surgeon to desist from any attempt to do more, and to close the wound as soon as possible.'

In two valuable articles on 'Abdominal Surgery' in the 'Boston Medical and Surgical Journal' of March and April 1881, the removal of uterine tumours is spoken of as 'a direct outgrowth from ovariotomy,' and the history of the operation is sketched from my first case in 1861 to the present time. In 1863, my experience of four cases led me to the conclusion that 'it would only be under most unusual circumstances that I would again remove an interstitial fibrous tumour of the uterus; a peritoneal outgrowth, or an ingrowth towards the uterine cavity and vagina, offering, in my opinion, far more

probability of successful removal than an interstitial tumour.' Ten years later, in 1873, further experience had brought me to the opinion quoted by the Boston reviewer, that 'when a uterine tumour is pedunculate, or can be separated from the principal part of the uterus, or when the whole of the fundus and body of the uterus, with or without the ovaries, can be removed, leaving the cervix and its vaginal attachments uninjured, the operative question is a different one, and recent experience is leading to a more encouraging view of the surgical treatment in such cases.'

After five years' additional work, I brought the surgical treatment of uterine tumours before the College of Surgeons in the Hunterian Lectures, giving the result up to that date of all my operations through the abdominal wall, amounting to forty-five cases. Tables of these cases may be seen in the 'British Medical Journal' of July 27, 1878. Very shortly after this publication I printed the following account of the excision of a fibro-cystic uterine tumour. On July 24, 1878, Mr. Cowan of Bath wrote to ask me to see a lady who was leaving for London that day, in order to consult me by his desire and that of Dr. Swayne of Clifton. The next day I saw this lady, thirty-nine years of age, suffering considerable abdominal pain and difficulty of breathing after her journey. I found that she had been married four years, and had not been pregnant. The catamenia were regular, and a period was due. She was suffering so much that I did not make a complete examination; and the next day, the suffering was so great that I tapped a large cyst, felt between the umbilicus and the sternum, and removed nineteen pints of dark fluid, with which (as the cyst became empty) a little blood was mixed. A large semi-solid tumour, reaching a little above the umbilical level, was then felt, and a harder portion was found in the right iliac fossa, which, by combined external and internal examination and the use of the sound, was ascertained to be the uterus, high up and to the right, closely connected with the lower portion of the tumour, but apparently separable the one from the other.

Mr. Cowan informed me that the illness commenced in the summer of 1876, in Italy, whither the patient had gone to

recruit after great mental strain. The first symptoms were dull pain in the left iliac region, with a sense of fulness, pain on pressure, and constipation, followed by a steady increase in size till February 1877, when he (Mr. Cowan) found 'fluctuation in the left iliac region, and a solid tumour passing down into the pelvis anterior to the uterus.' There was steady but slow increase until October 1877, when sudden painful swelling of the left leg set in, with acute pain in the left groin. After a fortnight this subsided, but the cyst increased more rapidly, and a solid mass was found to the right of the median line in the umbilical region. Dyspnœa and general distress increased, and walking became difficult.

My diagnosis was a multilocular ovarian cyst, displacing the uterus upwards and to the right. This was confirmed by an examination by Mr. Thornton of the fluid removed by tapping, who reported it as 'not differing in any way from ordinary ovarian fluid, except the blood, which is fresh, and probably from some accidental wound of a vessel. Now the blood has settled, it looks like the ordinary "linseed-tea" fluid, and the tests and microscope confirm its ovarian characters.'

Great relief followed the tapping. The catamenia came on and ceased on August 1. But the fluid began to collect again and some interference with respiration became an increasing trouble. Dr. Day examined the chest on August 10, and found some dulness on the lower part of the left lung, which he attributed to pressure. We, therefore, decided on removal of the tumour.

I performed the operation on August 12, under spray and with strict antiseptic precautions, assisted by Dr. Bantock, Dr. Woodham Webb, and Mr. Cowan of Bath, Dr. Day administering methylene. By an incision, five inches long, in the median line between the umbilicus and symphysis pubis, a very thin cyst was exposed. It was bluish in appearance, like the peritoneum. On tapping it, reddish serum escaped. Extensive adhesions to the abdominal wall above, and to the intestines behind and to the left, were separated, and the empty cyst was drawn out with a mass of solid substance at its base. I then found that both ovaries were healthy; that the uterus was about twice the normal size, irregularly nodulated and hardened; and the tumour was an outgrowth from the

back part of the fundus. The connecting medium or pedicle was fully an inch in length, and about two inches in breadth and one in thickness. I secured this in a large clamp and divided the attachment. Then I had to dissect off the back part of the tumour from the sigmoid flexure of the colon and from the rectum, with scissors. In doing this, I accidentally made an opening into the upper part of the rectum, about an inch long, but sewed it up immediately with an uninterrupted suture, carefully sponged out the peritoneal and pelvic cavities, secured several bleeding vessels in parts where adhesions had been separated, and closed the wound by silk sutures around the clamp, which lay at the lower angle of the closed wound.

Dr. Woodham Webb examined the tumour, and reported as follows: 'Weight of solid, two pounds and a quarter; fluid contents, fourteen pints. The tumour was an outgrowth from the upper and back part of the uterus, about seven inches long, four broad at its widest part, and at one point two inches thick. It was of a flattened lozenge-shape, and consisted of uterine tissue very slightly changed in appearance. It was surrounded by three large cysts, which had developed on its surface, two of about equal size and one not more than half that of the others—the three having contained fourteen pints of a red serous fluid. The walls of the three cysts were thin, with a fine layer of muscular tissue, spread out in irregular bundles between the two serous membranes—the peritoneum and the cyst lining. Inside the cysts, on the solid mass, were several ecchymosed spots, the lining membrane being detached and giving rise to small secondary cysts. There were a few nodules of fibrous tissue in various parts of the cyst-walls.'

The progress after operation was one of uninterrupted recovery. The highest temperature was 100·2°; the most rapid pulse, 108. The clamp came off on the eighth day. The wound above the clamp healed by first intention. Thymol gauze was the only dressing used.

Writing to me, December 5, 1878, the patient says: 'I am wonderfully well, and am getting back my walking powers. I have not felt so well nor in such spirits for years past.' She remains quite well at the end of the year 1881.

A much more remarkable case was that of a lady whom I saw in consultation with Mr. Symonds of Oxford in February 1878. She was single and thirty-six years of age. Her abdomen was enormously enlarged by a solid tumour, which extended upward behind the lower ribs on both sides, pressing them outwards, and passed downwards into the pelvis, filling up the hollow of the sacrum and causing prolapsus of the posterior wall of the vagina. There was considerable œdema of the feet and legs, which was said to disappear for a time after the cessation of each monthly period. The cervix uteri could not be reached, and it was impossible to ascertain where the uterus was situated. The catamenia were regular in time and normal in quantity. Mr. Symonds had advised removal of the tumour in 1876 when it was much smaller, but the patient and her friends steadily objected. The first symptom of illness was in 1868, when backache became troublesome, and soon after a small tumour was discovered in the left side of the abdomen. The growth went on slowly for some years, but in 1877 was much more rapid. When the patient came under our observation in February 1877, I expressed my opinion to Mr. Symonds that, as the tumour was quite solid, not fluctuating, and as the uterus could not be found, an accurate diagnosis was impossible, and that only an exploratory incision could determine as to the possibility of removal. I thought the tumour more likely to be uterine than ovarian, and probably some such rare form of abdominal fibroma as I had once removed in Germany, and which has been described by Virchow as *fibroma molluscum*, not necessarily connected with either uterus or ovaries. The decision as to operation being left to the patient, she at first declined, but suffering became daily greater, and it was arranged that I should make an exploratory incision on March 7, four days after the cessation of the catamenia.

The sketch on the next page, although made of another patient, gives an excellent idea of the appearance of this lady at the time, except that it hardly shows how much the tumour encroached on the thorax, and not at all the œdema of the legs.

Mr. Symonds and Mr. Hill being present, my incision was made in the median line between the umbilicus and pubes, and

I cut into the substance of a solid tumour which was closely adherent to the abdominal wall. After separating some adhesions, I passed my hand into the peritoneal cavity and found the tumour to be free from adhesions on the left side, also behind and above, but to be closely bound down on the right side. In front, the bladder was so high that the incision could not be carried within about four to five inches of the pubes. So it was extended upwards, about five or six inches above the umbilicus, as soon as I had convinced myself that it would be possible to remove the tumour. A large piece of adhering omentum was detached from the upper part and behind. Towards the left side a broad mesenteric attachment was divided by the knife, large vessels being temporarily secured by torsion-forceps. I was then able to shell out the tumour from a sort

of vascular capsule, formed by two layers of the right broad ligament, and separate it, but only by the knife, from the posterior surface of a uterus of normal size, after forcibly pulling the tumour up out of the pelvis and separating it from the rectum, to which it adhered closely. The right ovary (although normal) was cut away because the Fallopian tube had been divided and the broad ligament was much torn. The left ovary and Fallopian tube were not disturbed. Several silk ligatures were applied to the right of the uterus, and also to open vessels on its posterior surface where the tumour had been cut away. Two large pieces of omentum were cut off after securing them by ligature. I then found that the two opposite sides of the remnant of the capsule of the broad ligament (out of which I had enucleated the tumour) could be

brought together behind the uterus, so as to complete the union of the divided peritoneum from the lower angle of the opening in the abdominal wall, over the elevated bladder and the fundus uteri, all down the back of the uterus to the rectum. I did this by an uninterrupted suture of fine silk, making about twenty points of suture, and finishing close to the vagina and rectum. In this way the peritoneal sac was completely shut off from the torn cellular tissue of the pelvis. A good deal of sponging was necessary to remove clots of blood from the peritoneal cavity; but very little blood was lost considering the great size of the tumour and the extent of its attachments. The opening in the abdominal wall was closed by twenty-five silk sutures. The patient was placed in bed exactly an hour from the minute when she began to inhale methylene. She was faint and very chilly, a spray of a solution of thymol (1 in 1,000 of water) having played upon the abdomen all through the operation; and, although sponges moistened with warm thymol solution protected the abdominal cavity to some extent, the chilling effect of the spray was manifest.

Upon examining the tumour it was found that about two pounds of blood had drained from the vessels divided in its capsule, and at its line of separation from the uterus. Its circumference, in three different directions, was 52 inches at the smallest, 57 inches at the largest, and 53 inches in a third. A small piece was cut out for microscopical examination, and the tumour was then weighed in the museum of the Middlesex Hospital, and found to be 68 lbs. 6 oz. The tumour was 'chiefly composed of cells with relatively large nuclei, many containing several nucleoli of the type difficult to distinguish as distinctly muscular; but in some parts of the tumour unstriped muscle-cells were manifest.' (J. K. Thornton.) I have very little to add as to the progress after operation, except that the temperature seldom rose above 99°, only reaching 101·2° (the highest noted) once. Only four opiates were given. There was never any distension of the abdomen. Six days after operation, the bandage and dressing were removed for the first time. The four or five layers of thymol gauze next the skin were damp with serum; the outer layers were quite dry. The wound was united from top to bottom.

All the twenty-five sutures were removed, and the line of union was almost imperceptible. The dressing was only changed twice after this; and, except a few drops of pus from one of the central stitchholes, union was perfect by first intention.

For a few days in the second and third week after operation the patient occasionally vomited, and was weak and low-spirited, and there was a considerable swelling in the pelvis, as if from a hæmatocele in front of the rectum, to such an extent that the uterus could not be felt. There were frequent very offensive watery motions, but never any purulent discharge. When the swelling in the pelvis began to subside, and after washing out the rectum with thymol solution, rapid amendment set in and went on. Two days before she left London by rail for Oxford, on April 8, just a month after operation, I carefully examined the pelvis by vagina and rectum, and really could not find any trace of an operation having been performed. The uterus was in its normal position, was movable, and of ordinary size and weight. She wrote herself in May, saying 'I am able to walk a little, and get out in the air as much as possible.' But improvement did not continue; a pelvic abscess formed, which was not opened, and she died in August.

In the two years which followed, I adopted two important modifications in the operative procedure—first, the more complete use of antiseptic precautions; and, secondly, the union by suture of the peritoneal edges of the divided uterine wall. I also contrived better pressure-forceps for securing divided blood-vessels before tying. In the paper read at the Cambridge meeting of the British Medical Association, in August 1880, and published in the Journal of the Association, September 4, 1880, I said, 'Whatever doubt some may entertain as to the value of my experiments on animals, and practice on women, in leading most operators in the present day to bring divided edges of peritoneum together whenever they have been separated by wound or by operation, I myself have no doubt whatever about it; and just as strongly as I assert that it is, and must be, better, when the abdominal wall is divided, to bring the peritoneal edges and surfaces of the opening together, restoring the complete closure of the peritoneal

cavity, than to leave the cavity free to the admission of fluids oozing from wounded muscle, fat, and cellular tissue, and to allow contact of intestine and omentum with anything more than peritoneum; so strongly—more strongly if I could—would I insist that the peritoneal edges of the divided uterine wall, or of the connecting part of the outgrowth with the uterine wall, should also be carefully brought together . . . by many sutures, or by uninterrupted suture along the whole extent of the gap.' In concluding that paper, I alluded to a case then under observation, which I brought forward partly to illustrate the advantage of completely uniting by suture the divided edges of the peritoneal wall, and partly to argue that, when the uterine cavity has been opened, it is better not to close the mucous surfaces also by sutures, after the method of Schröder, as the opening left for some oozing of blood through the vagina may sometimes be useful. A few more details of this case may be now given.

On June 9, 1880, I saw a married lady, aged 62, in consultation with Dr. Richard Smith, of Haverstock Hill, who had been called in about a fortnight before, on account of uterine hæmorrhage. This, after twelve years' absence, had come on at the end of 1879, and had recurred since every three weeks, lasting one week. She had consulted an obstetric physician four years before, who said that there was 'ovarian enlargement.' She had been married twice, had one child by her first husband, twenty-nine years ago, and had never been pregnant since. With the return of the uterine hæmorrhage, there occurred enlargement of the abdomen, which increased rapidly, loss of flesh, shortness of breath, and very obstinate constipation. The girth of the abdomen at the most prominent part was 42 inches. The uterine cavity only measured $2\frac{3}{4}$ inches, but the cervix moved in all directions with a large semi-solid tumour, which filled the whole abdomen quite up to the ensiform cartilage. I removed the tumour on July 21, 1880, cutting away nearly all the supravaginal portion of the uterus, and after tying all bleeding vessels carefully, sewing together the peritoneal edges of the divided uterine wall. For about three days afterwards a little bleeding went on through the vagina, but the patient recovered without any febrile elevation of temperature, was in excellent health in 1881, and so remains. The

doubt as to the tumour being ovarian was accounted for by the fact that a large cyst-like cavity in the centre of the tumour contained thirteen pints of bloody fluid, while the solid portion weighed only a little more than two pounds. I am much indebted to Dr. R. Smith for his assistance at this operation, and for his care of the patient afterwards, as she remained in his charge during my absence from London.

In this and previous cases, I had been content with the pressure-forceps described and figured in the 'British Medical Journal,' vol. i., 1879, p. 928; but, feeling the want of more effectual means of securing bleeding vessels before dividing them, I had forceps made similar in form, but with longer handles, and a compressing surface more than an inch in length. With several pairs of such forceps, applied before any tissues are cut through, large tumours may be cut away with only very small loss of blood. They were used with excellent effect in the following case.

On September 27, 1880, assisted by Mr. Thornton and Mr. A. Doran, I removed a large solid uterine fibro-myoma from a single lady, aged 41. By an incision eight inches long, the tumour was exposed, or rather the omentum, containing very large veins, which covered the tumour and adhered to it. Two ligatures were applied to the omentum, which was then divided between them. Some adhesions to the abdominal wall were then separated, and the tumour turned out entire. It was an outgrowth from the left side of the fundus uteri. The band of connection between the uterus and the outgrowth was between two and three inches in length, and about one inch in breadth. This was first compressed and held by two of the large forceps just described, and the tumour was cut away. Then a large needle and double thread was pushed through the uterine tissue behind the forceps, and each thread was tied as the forceps were taken off. Lastly, the peritoneal edges of the divided uterine wall were brought together by an uninterrupted suture of fine carbolized silk. After the removal of the tumour, the rest of the uterus appeared to be quite normal in size and consistence. Both ovaries were healthy. Recovery went on without fever—the highest temperature was 100·2°. There was unusual nervous irritability during convalescence, perhaps explained by the facts that her father and an uncle had both

been insane, and attempted suicide; but she went away thirty days after operation, in a very good state of health, and has since been quite well. Mr. Doran described the tumour as a solid uterine fibro-myoma, weighing between seven and eight pounds.

The tumour in the following case was very much larger, and the patient in a state of the utmost distress from its weight and pressure. It was a solid fibro-myoma, which weighed twenty-five pounds, after all blood and serum had drained from it. I removed it on October 7, 1880, assisted by Mr. Thornton, Mr. Vevers of Hereford, and Mr. Orton of Foleshill, near Coventry. The incision was eight inches long. Three to four pints of clear fluid escaped on dividing the peritoneum. A nodular solid tumour was covered by vascular adherent omentum. This was tied and divided. There was no pedicle. The growth was a prolongation, or irregular enlargement, of the fundus uteri. After fixing each end of the narrowest part of the neck of the growth by pressure-forceps, I amputated the fundus just beyond the forceps, opening the uterine cavity at the posterior part of the growth. Six portions of uterine tissue were tied, after three transfixions, with double silk ligatures, as the forceps were removed, and several large vessels were also tied separately. The peritoneal coat of the uterus was then united by a line of uninterrupted suture, so as to cover up the divided uterine tissue. The line of union measured between three and four inches. More than a pint of blood was lost. I made no note of the state of the ovaries. The patient was extremely weak for a fortnight after the operation; but she went to Coventry at the end of a month, and she called on me in May 1881, in excellent health. I could detect nothing by abdominal or pelvic examination, except the linear cicatrix in the abdominal wall, to show that any operation had been performed. The catamenia are quite regular, and had only been excessive for the two or three periods just after the operation.

I had seen this patient several times during the six years from the discovery of the tumour till the operation, and had at first dissuaded her from any interference, on account of a strong vascular thrill always felt in the left side of the vaginal wall. It was not till ascitic fluid formed, and the tumour became

more mobile, that I agreed to operate. The vascular thrill was explained by omentum adherent to the lower part of the tumour, and containing very large blood-vessels.

The next case is also one of almost unexpected, but complete, recovery. In May 1876, a married lady, aged 38, called on me with a letter from Dr. Birch of Hazaribagh, in India, under whose care she had been since May 1875. She was married in 1871, went to India in the same year, had never been pregnant, but remained in good health until she suffered from fever in September 1874. In February 1875, Dr. Ewart of Calcutta discovered an abdominal swelling which he thought might possibly be early pregnancy, although there had been no irregularity in menstruation. The swelling increased rapidly in 1875, and, when I saw her in May 1876 the uterus was evidently enlarged to the size in the fifth or sixth month of pregnancy. As there were no urgent symptoms, she returned to India, and I did not see her again until May 1877. There had been some slight increase in the size of the uterus, and menstruation was becoming rather profuse; but she remained in fairly good health till July 1878, when her general health suffered after much anxiety and over-exertion; but she got over this, and went through 1879 pretty well. In June 1880, the tumour having considerably increased in size, Sir W. Jenner saw her with me in consultation as to the question of operation, and it was decided that there should be further delay, but that the tumour should be removed as soon as it became intolerable. Menstruation became still more profuse, size increased, she lost flesh, became unable to take any but very short walks, the feet swelled, and purpuric spots appeared on the legs. In December 1880, at another consultation with Sir W. Jenner, we found a large solid tumour, reaching quite up to the ensiform cartilage, and an ovary could be felt and moved in each iliac region. The uterine cavity was slightly elongated, but I thought the tumour and part of the fundus uteri might probably be removed without opening this cavity. It was agreed that I should attempt to remove the tumour; but that, if the difficulty proved to be greater than I expected, I should then remove both ovaries in the hope of thus leading to atrophic change in the tumour. We waited until after the cessation of another menstrual period, and I then went into Gloucestershire.

and operated on February 12th, 1881, assisted by Dr. Forty and Mr. Simmons of Wotton-under-Edge, Mr. Wickham of Tetbury, and Mr. A. Grace of Sodbury. Dr. Day administered methylene. After making an incision from two inches above to six inches below the umbilicus in the median line, the enlarged solid uterus was exposed, free from adhesions, but covered by very large veins, and there was no distinct neck to the tumour or fundus. The left ovary was large, and both were easily separable from the tumour. My first intention, accordingly, was to be satisfied with removal of both ovaries, and leave the uterus alone. On drawing up the left ovary, a cyst, or corpus rubrum, in it burst, and much black clot was pressed out. I then transfixed, tied the connecting tissues between the ovary and the enlarged uterus, and cut the ovary away. Very free bleeding followed, and successive ligatures cut through a soft venous plexus. I therefore felt compelled to remove the tumour, and, after applying on each side, before and behind, four pairs of large pressure-forceps, I amputated the tumour, cutting through the fundus uteri diagonally from the right Fallopian tube, downwards and to the left of the bleeding surface, where the left ovary had been attached. The uterine cavity was not opened. Part of the fundus and the body left with the cervix were normal in size and consistence. The left Fallopian tube was removed with the tumour. The right remained; and the right ovary, although rather large, was not disturbed. Theoretically, it would have been better to remove it; but I was very unwilling to prolong a serious operation by anything not absolutely necessary. Several very large arteries and veins were secured, some by ordinary ligature of carbolized silk, some by ligature after transfixing the uterine tissue; and then the peritoneal edges of the divided fundus were brought together by suture. Although a great deal of blood was lost, the lips never lost their colour, and there was no vomiting. The patient was exactly an hour under the influence of the anæsthetic, and Dr. Day told me that he had never given so much methylene before at any of my operations. Nearly two ounces were used. I did not make any provision for drainage, as I had carefully sponged away all blood and clot; and the wound was united in the usual way by silk sutures. Phenolized spray was used, phenolized sponges, ligatures, and instruments.

and dry dressing. The tumour was a solid fibroma, with several projections or outgrowths from the peritoneal surface. It weighed 11½ lbs.

The patient was left in charge of Dr. Forty of Wotton-under-Edge, and recovery was uninterrupted by any bad symptom. The temperature reached 101°, and the pulse 104, on the third day; but the convalescence may be said to have been without fever. I saw the lady in London on April 28th, quite well, and with nothing but the linear cicatrix in the abdominal wall to be detected as showing that there had ever been any disease of the uterus. The cervix was mobile, and nothing abnormal could be discovered anywhere. The catamenia appeared quite as usual the first week in May, after an interval of three months, and passed off quite normally. The lady called on me in London in November 1881 in excellent health, menstruating regularly, and with no sign of having undergone any operation except the cicatrix in the abdominal wall.

In the following case, operated on June 27, 1881, the operation might have been described in exactly the same terms, except that the left ovary was left with the remnant of the uterus in this case, while the right ovary was left untouched in the preceding case. Both may be described as supra-vaginal amputation of the uterus with removal of an ovary. The lady was a widow, 52 years of age, but still menstruating regularly and profusely, mother of four children, the youngest of whom is 26 years old. She was sent to me by Dr. Kidd on account of severe flooding at every monthly period, which went on to faintness, and was followed by extreme exhaustion. Sir W. Jenner saw her with me; and, on the risk of the operation for the removal of the large uterine tumour being explained to her, she decided to wait. She went to Switzerland, and almost died at Berne from most alarming hæmorrhage. As soon as she was able to travel she returned to England, determined to submit to the operation which I have already alluded to. The recovery was uninterrupted except by a very troublesome irritation of the bladder. She was obliged to travel to Davos-Platz in October 1881 with an invalid relative, and although she suffered at first from living at such an elevation, she wrote to me on December 15, 1881, saying, 'The pain in the bladder

scarcely gives me any trouble, and I have seen nothing at the monthly periods.' Indeed, the only inconvenience arising from the operation is the necessity for wearing a belt in consequence of the threatening of a ventral hernia at a weak part of the cicatrix in the abdominal wall.

In one other case of removal from a married lady 35 years of age, of a large solid uterine fibroma, weighing between fifteen and sixteen pounds, and which had been surrounded by ascitic fluid, I have to record an almost sudden death from shock and hæmorrhage. The patient died a few minutes after being placed in bed. No very great amount of blood was lost, but the patient took methylene very badly, and I think she was injuriously affected by the cooling influence of the spray. Beyond this there was nothing in the operative procedure which differed from the cases of the patients of Dr. Forty and Mr. Vevers just described.

These are all the cases in which I have removed uterine tumours entirely since August 1880, and all but this last have recovered in the most satisfactory manner. In three other cases I made simple exploratory incisions; doing nothing more, as the difficulties of removal appeared very great. One patient died a week after the incision, of peritonitis. The other two were neither better nor worse for the incision. In another case, a patient of Dr. Andrews of Hampstead, a single lady, aged 60, I was only able to remove part of a fibroma, after emptying a large cyst-like cavity. The patient died on the third day. And in one other case, a patient of Dr. Monro of Newtown, Montgomeryshire, where I could only remove a projecting outgrowth from the main part of the tumour, the patient, who was in an extremely feeble condition before the operation, died on the eighth day. One lady, a patient of Mr. Laurence of Chepstow, Dr. Bond of Shrewsbury, and Sir W. Jenner, recovered and has remained in good health after the emptying of a large uterine cyst of blood-clot.

I feel very hopeful that, by the use of the improved pressure-forceps, the arrest of hæmorrhage will be effected much more easily and completely than before; that suture of the uterine wall will obviate more than one source of danger; and that, by careful attention to all needful antiseptic precautions, the removal of uterine tumours may henceforth be undertaken

with a far more confident expectation of a successful result than could have been reasonably entertained a very few years ago.

All the cases in which I have removed, or attempted to remove, uterine tumours are arranged in the following tables. The first contains particulars of 39 cases of removal, the second 31 cases of partial removal or of exploratory incision.

TABLE I.—*Cases of*

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
1	Professor Pirrie, Aberdeen	1861 Oct.	33	Married	None
2	Dr. Sim, Naples	1863 Jan.	35	Single	None
3	Mr. Ellis, Sloane Street	,, April	53	Single	Omental and parietal
4	Samaritan Hospital	1868 April	40	Married	Omental and mesenteric
5	Dr. MacMurty, West Bromwich	1869 April	36	Single	Parietal
6	Dr. Fuller	,, May	37	Married	None
7	Dr. Brandt, Oporto	1870 June	36	Single	Omental
8	M. Nélaton, Paris	1871 June	46	Married	None
9	Dr. Protheroe Smith	1872 Jan.	38	Single	None
10	Dr. Conrad, Berlin	,, March	44	Single	None
11	Dr. Roberts, Rhyl	,, May	36	Married	Notes defective
12	Mr. Soper, Dartmouth	1874 April	33	Married	Omental
13	Sir W. Jenner, Bart.	,, Dec.	32	Single	None
14	Dr. Schantz, Witten	1875 May	40	Single	Omental
15	Dr. Schönfeld, Labes	,, May	40	Widow	None
16	Mr. Peck, Yalding	1876 April	37	Single	Omental and parietal
17	Dr. Playfair	,, Aug.	49	Single	None
18	Dr. Kidd, Dublin	,, Oct.	36	Single	None
19	Dr. Neild, Plymouth	,, Nov.	40	Single	Peritoneal, omental, mesenteric, and intestinal
20	Dr. Jack, Hampton Court	1877 March	49	Single	Parietal
21	Dr. Day	,, April	52	Single	None
22	Dr. Freeborn, Oxford	,, July	56	Single	None
23	Dr. Hetley, Norwood	,, July	50	Single	None
24	Dr. Symonds, Oxford	1878 March	36	Single	Parietal, mesenteric, and omental

Removal of Uterine Tumours.

Treatment of Pedicle	Weight and nature of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
		inches			
Ligature brought out of the wound	Fundus and body of uterus, 27 lbs.; both ovaries removed	10	Died 4 days afterwards	Exhaustion	1
No pedicle; tumour enucleated	17 lbs., solid; fibroid intramural	6	Died in 4 hours	Hæmorrhage and chloroform	2
Ligature brought out through the wound	Fibroid cystic outgrowth from fundus; solid, 16 lbs.; 26 pints fluid; 4 lbs. clot in cyst; right ovary adherent, and removed with tumour	9	Death in 3 hours	Shock; chloroform (?)	3
Ligature returned .	Fibroid size of cocoa-nut	5	Died 44 hours after operation	Peritonitis	4
Acupressure . .	Solid tumour, 34 lbs. 10 ozs.	11	Died in 40 hours	Peritonitis	5
Ligature . . .	Fundus and body of uterus removed	5	Recovered	Died 6 months afterwards of cancer of cervix	6
Pin and ligature; extra-peritoneal	Solid myoma, 22 lbs.		Died, 14th day	Pyæmic pleurisy	7
Pin and ligature; extra-peritoneal	11 lbs. 11 ozs., solid; 59 pints peritoneal fluid	11	Recovered	Well in 1881	8
Ligature returned .	20 lbs.; fibroid removed with left ovary	8	Died, 3rd day	Peritonitis	9
Pin and ligature .	Uterus and both ovaries, 26 lbs.	10	Died in 2 hours	Hæmorrhage	10
Notes defective .	Uterine fibroid and right ovary removed	?	Died	Suppurative peritonitis	11
Clamp . . .	Fibroid myoma, 11½ lbs.; right ovary	8	Recovered	Well June 1878	12
Ligature returned .	Fibroid myoma, 9 lbs.	8	Died in 40 hours	Hæmorrhage	13
Clamp . . .	Fibro-cystic uterine and right ovary, 19 lbs.	6	Recovered	Well in 1878	14
Ligature and drainage	Fibroma molluscum cysticum, 29 lbs., and right ovary	6	Recovered	Well in 1881	15
Clamp . . .	Sub-peritoneal outgrowth from fundus	7	Recovered	Well in 1878. Tumour in Museum	16
Clamp . . .	Large uterine fibroid and both ovaries	9	Died, 5th day	Pneumonia	17
Ligature returned .	Fibroid sub-peritoneal removed	4	Recovered	Well in 1881	18
Ligature returned .	Fibro-cystic; two outgrowths, 2½ lbs.	6	Died, 4th day	Peritonitis	19
Clamp . . .	Fibro-cystic, 20 lbs.; and left ovary	6	Died in 20 hours		20
Ligature returned .	Two fibroid outgrowths removed; 4 lbs. 4 ozs.	6	Recovered		21
Ligature returned .	Solid fibroid outgrowth from fundus. 5 lbs.	6	Died, 6th day	Septic peritonitis	22
Needle and écraseur chain; extra-peritoneal	Uterine fibroid, 12 lbs., and both ovaries	8	Died, 3rd day	Septic peritonitis	23
Ligatures returned.	Fibro-cellular, 70 lbs.	16	Recovered	Died 5 months afterwards of pelvic abscess	24

TABLE I.—*Cases of Removal*

No.	Medical Attendant	Date of Operation	Age	Condition	Adhesions
25	Mr. Larkins	1878 June	36	Single	None
26	Mr. Cowan, Bath	,, Aug.	39	Married	Abdominal wall and intestines
27	Mr. Cribb	,, Dec.	38	Married	
28	Mr. Wheelhouse, Leeds	1879 Feb.		Married	Omental and intestinal
29	Mr. Stretton, Kidderminster	,, Aug.		Single	Ovary (right) adherent to tumour
30	Mr. Pearse, Camelford	,, Oct.	52	Married	None
31	Dr. Iterson, Gouda, Holland	,, Oct.	40	Married	Parietal, omental, and intestinal
32	Dr. Pratt, Paris	,, Dec.	30	Single	None
33	Mr. Lock, Tenby	1880 Jan.		Married	None
34	Dr. R. Smith, Haverstock Hill	,, June	62	Married	None
35	Dr. Attenburrow, Jersey	,, Sept.	41	Single	Abdominal wall and omentum
36	Dr. Orton, Coventry	,, Oct.		Married	Omentum
37	Dr. Birch, Hazaribagh, India	1881 Feb.	43	Married	None
38	Dr Kidd	,, June	52	Widow	None
39	Dr. Webb	,, Nov.	35	Married	Omental

of Uterine Tumours—continued.

Treatment of Pedicle	Weight and Nature of Tumour	Length of Incision	Result	Subsequent History or Cause of Death	No.
		inches			
Transfixion and tying, including Fallopian tube	12 lbs.; solid fibroid	8 to 9	Died, 4th day	Hæmorrhage and peritonitis	25
Clamp . . .	Cystic outgrowth from fundus, 2¼ lbs., containing 14 pints	5	Recovered	Well in 1881	26
Ligatures . .	Amputation of all supravaginal portion of uterus	6	Died same day	Hæmorrhage	27
Transfixed and tied	Large solid fibroid on fundus of the uterus, base 2 inches wide	7	Died, 3rd day	Peritonitis	28
Transfixed and tied. Several vessels ligatured separately	Solid fibroid of uterus, 29 inches in circumference. Ovary attached and removed	7	Recovered	Well in 1881	29
Forceps and ligature	Fibroid outgrowth from uterus with pedicle	6	Recovered	Well in 1881	30
Cyst cut away. Ligatures on stump of fibroid	Fibro-cystic of uterus, 26 lbs.	6	Recovered	Well in 1881	31
Came away on tying ligature. Second ligature and sutures	Fibroid outgrowth from uterus	4	Recovered	Left London a month after operation. Well in 1881	32
Enucleated. Vessels tied. Peritoneum sewn over bare surface	Two fibroid tumours on the fundus of uterus, one softening	6	Died, 3rd day	Peritonitis	33
Vessels tied. Peritoneum sewn over stump	Fibro-cystic of uterus	6	Recovered	Well in 1881	34
Pedicle compressed, tied, and peritoneum sewn over cut surface	Solid uterine fibro-myoma, between 8 and 9 lbs.	8	Recovered	Well in 1881	35
No pedicle. Amputation of fundus. Peritoneum sewn over amputated part	Solid fibro-myoma of uterus	8	Recovered	Well in May 1881	36
No pedicle. Upper part of uterus, left ovary, and Fallopian tube cut away. Peritoneal cut edges sewn together	Enlarged solid uterus, fibroid with outgrowths, 11½ lbs.	8	Recovered	Well Feb. 1882	37
Ligatures and sutures	Fibroid enlargement of fundus, 9 lbs.; removed with left ovary	8	Recovered	Well October 1881	38
Ligatures . .	Fibro-myoma uteri, 15 lbs.	8	Died	Almost immediately after operation. Shock and hæmorrhage	39

TABLE II.—*Cases of Exploratory Incision and Partial*

No.	Medical Attendant	Date of Operation	Age	Condition
1	Dr. Shorthouse, Carshalton	1863 April	33	Single
2	Dr. Stokes, Dublin	1864 June	45	Single
3	Samaritan Hospital	1866 Dec.	39	Married
4	Dr. Churchill, Dublin	1867 Aug.	48	Married
5	Dr. Garrod, London	1868 Feb.	58	Widow
6	Dr. Arthur Farre	1869 Jan.	42	Married
7	Mr. Turner, Hereford	„ Nov.	25	Married
8	Mr. Marsden	1870 June	33	Married
9	Dr. Whitehead, Manchester	„ Dec.	35	Single
10	Dr. Wane	1871 Aug.	63	Married
11	Dr. De la Camp, Hamburg	1873 April	36	Married
12	Dr. Philpot	„ July	30	Single
13	Dr. Gason, Rome	1875 May	31	Single
14	Dr. Hodgson, Hornsea	1876 June	33	Married
15	Dr. Thursfield, Leamington	„ June	35	Married
16	Dr. Hall Davis	„ Sept.	34	Widow
17	Dr. Arthur Farre	„ Oct.	46	Married
18	Mr. Sweeting, King's Lynn	„ Nov.	38	Married
19	Dr. Whitehead, Manchester	1878 Feb.	41	Married
20	Mr. Claremont, Hampstead Road	„ May	42	Single
21	Dr. Regensburger, San Francisco	„ Oct.	42	Married
22	Mr. Goddard	„ Nov.	45	Married
23	Mr. Lunn, Hull	1879 May	41	Married
24	Dr. Latham, Cambridge	„ Oct.	40	Single
25	Mr. Laurence, Chepstow	1880 Feb.	42	Married
26	Dr. Andrews, Hampstead	„ Oct.	60	Single
27	Mr. Vevers, Hereford	„ Oct.	52	Single
28	Mr. Heslop, Birmingham	„ Oct.	40	Single
29	Dr. Hill, Lymington	„ Oct.	50	Single
30	Dr. Monro, Newtown, Montgomeryshire	1881 Feb.	40	Married
31	Mr. Roper, Blackheath	„ March	36	Married

Removal of Fibro-cystic Tumours of the Uterus.

Adhesions and character of Tumour	Incision	Result	Subsequent History or Cause of Death	No.
None; solid tumour punctured; no fluid	Short	Left hospital 10th day	Died 16 months after operation; the tumour then weighed 25 lbs.; had 34 pints of fluid around it	1
To intestines and omentum; 30 pints of ascitic fluid, 13 pints of cystic fluid, and 20 lbs. fibroid tumour removed	6 inches	Death in 3 hours	Hæmorrhage; portion of tumour not removed, 18 inches in length and 7 in thickness; not weighed. A second tumour, 11 in. broad, 6 in. long, and 6 in. deep	2
Ascitic fluid removed; solid uterine tumour punctured		Relieved	Died some months afterwards	3
Uterine fibroid punctured . .	5 inches	Suppuration and relief	Patient died in 1871	4
Parietal; fibro-cystic tumour punctured, 8 pints purulent fluid removed	No note	Recovered	Remained well two years, but died in 1872	5
Large uterine fibroid not disturbed	4 inches	Recovered	In fairly good health, 1881	6
Ascitic fluid only removed; fibroid tumour not disturbed	4 ,,	Recovered		7
Incision only		Recovered	Died two years afterwards, 1872	8
None; incision only . . .	5 ,,	Recovered	Alive in 1878	9
None; ascitic fluid removed; uterine cyst tapped	5 ,,	Died	Fifteen days after operation	10
None; ascitic fluid only removed .	4 ,,	Recovered	Died in 1877	11
Parietal; incision only . . .	4 ,,	Recovered	Well in 1877	12
Incision only	5 ,,	Recovered	Well in 1878	13
None; cyst tapped and emptied; solid fibroid not disturbed	5 ,,	Recovered	Well in 1878	14
Incision only	5 ,,	Recovered	Died of diphtheria in Feb. 1878	15
Incision; ascitic fluid; fibroid tumour untouched	5 ,,	Recovered	Died in 1878	16
Fibro-cystic uterine drained; parietal and omental	5 ,,	Recovered	Died in 1881. Albumenuria	17
Incision only	5 ,,	Recovered		18
Incision; removal of nodule . .	5 ,,	Recovered	Well in June 1878	19
Incision only	4 ,,	Recovered	Died July 11, 1878	20
Incision only	5 ,,	Recovered	Well in 1881	21
Uterine cyst drained . . .	5 ,,	Recovered	Died in 1881	22
Incision only	5 ,,	Recovered	Well in 1881	23
Solid fibro-myoma not disturbed .	5 ,,	Recovered	Well in 1881	24
Intestinal; no pedicle; blood cyst drained	4 ,,	Recovered	Well in 1881	25
Incision; tapping of cyst and removal of part of fibroma of uterus	5 ,,	Died, 3rd day	Peritonitis	26
Simple incision; uterine vein wounded	4 ,,	Died, 7th day	Peritonitis	27
Simple incision	4 ,,	Recovered	Neither better nor worse for incision	28
Simple incision	4 ,,	Recovered	Neither better nor worse for incision	29
Incision and removal of projecting outgrowth from main part of fibroma of uterus	5 ,,	Died, 8th day	In extremely feeble condition before operation	30
Incision only; bladder wounded	4 ,,	Recovered	Well in October 1881	31

CHAPTER XVIII.

ON PARTIAL AMPUTATION AND ON COMPLETE EXCISION OF THE UTERUS.

The removal of fibroid tumours of the uterus and the partial amputation of the hypertrophied uterus, have led on to its more or less complete extirpation in cases of uterine cancer. The names of Blundell and Freund are associated with these operations. More recently Porro has supplemented the Cæsarean section by the removal of the entire uterus except the vaginal portion, which is left after amputation at about the division between the neck and the body of the organ. The case which I am about to describe is not identical with any of these proceedings. It was not a supra-vaginal amputation, but a complete taking away of the whole gravid uterus and its appendages. Even if I had followed Porro's example it would have been the first case of the kind in Great Britain. But cutting round the neck into the vagina and leaving no stump makes my operation not only the first excision of the gravid uterus in this country, but one unique in its mode of performance, completeness, and success.

The case was that of a farmer's wife, 37 years of age, pregnant six months with her sixth child, and suffering from epithelioma of the cervix uteri. She was brought to me for consultation at my house by Dr. Goldsworthy Tucker, of Farningham, on October 5, 1881. She had borne a child sixteen months previously, had nursed it for three months, became weak and troubled with vaginal discharge, but again became pregnant, and aborted at six weeks, towards the end of 1880; again menstruated in March, April, and May 1881. The exact date of the last conception is doubtful, but the calculation must be made from the month of May. At her first visit to me she was quite conscious of the movements of the

child, ballottement was distinct, and I could hear the sounds of the fœtal heart. The cervix uteri was long and enlarged, the os admitting one finger easily for one inch, and the cervical canal was surrounded by a mass of epithelioma, which everted the lips of the os and projected downwards into the vagina. Proposals for the inducing of premature labour and for the removal of the diseased cervix had already been discussed in other consultations with Dr. Playfair; but it seemed to me that the disease was so distinctly limited to the cervix that if all the morbid tissue were scraped away and chloride of zinc applied to the denuded surface, pregnancy might go on to the full term. And this procedure was decided upon. A few days more, however, reduced the patient to such a state of pain and weakness, with great increase of the discharge, that we were called to review with Dr. Graily Hewitt the various objections and advantages of the different courses open to us. Our deliberations ended in the decision that it would be better to remove the whole uterus and its contents, and I accordingly performed the operation on October 21, with the assistance of Mr. Thornton and Mr. Doran; Dr. Graily Hewitt, Dr. Tucker, and Mr. Cadge of Norwich being present.

The patient was secured as for ovariotomy; but, as it was necessary to keep a catheter in the bladder, an opening was made expressly for it in the waterproof covering. The vagina was plugged with thymol cotton, wetted with warm water containing about 1 per cent. of phenol. I divided the abdominal wall in the middle line to an extent of about eight inches, from two inches above to six inches below the umbilicus. The uterus thus exposed was about the size of a large adult head. After turning it out I inserted four sutures in the upper part of the wound over a large flat sponge, so as to keep back the intestines and protect the abdomen from needless cooling by the spray. I found the ovaries at a higher level and nearer to the fundus than was expected, and it was quite easy to secure the spermatic artery, first on the left and then on the right side, by transfixing the broad ligament below each ovary and tying with strong silk. I took the catheter as my guide in dissecting the bladder from the anterior surface of the uterus. The expanded uterine coats were very thin, like a tense cyst, and they were soon accidentally ruptured. I punctured the protruding

membranes and a quantity of liquor amnii escaped. The next thing was to draw out the fœtus, and tie and cut the cord; but I did not interfere with the placenta. I then separated the attachments between uterus and vagina, completely circumcising the neck, and securing by pressure-forceps all bleeding vessels as they were divided. The entire uterus, with all the diseased parts about the os and cervix, was thus removed. The forceps were then taken off successively, and every bleeding vessel tied with carbolized silk. Then, taking out the vaginal plugs, I brought together the opening into the vagina, and the edges of the divided broad ligaments, with silk sutures. The pelvis was carefully cleansed, the wound closed as usual with silk sutures, and the ordinary dressing applied as after ovariotomy.

The patient was under the influence of methylene for about 75 minutes, but the operation from beginning the incision to closing the wound was completed within an hour.

Mr. Cadge kindly noted the time occupied by the different stages of the operation as follows:—

2.35 P.M. Patient began to inhale methylene.
2.41 „ Catheter and plugging vagina.
2.50 „ Incision in abdominal wall.
2.53 „ Uterus drawn out.
2.56 „ Sutures in upper part of abdominal wall, dividing broad ligaments and vagina, removing fœtus and securing vessels, till
3.10 „ Uterus removed.
3.40 „ Ligature of vessels and sutures of vagina and broad ligaments.
3.50 „ Closing of wound and dressing.
3.55 „ Patient in bed.

The uterus has been preserved in the Museum of the Royal College of Surgeons, and the accompanying drawings are back and front views of the preparation.

The first of these drawings shows the posterior aspect of the entire uterus and ovaries as they were removed. The shred of peritoneum seen hanging near the central part of the diseased cervix was stripped from the anterior surface of the rectum.

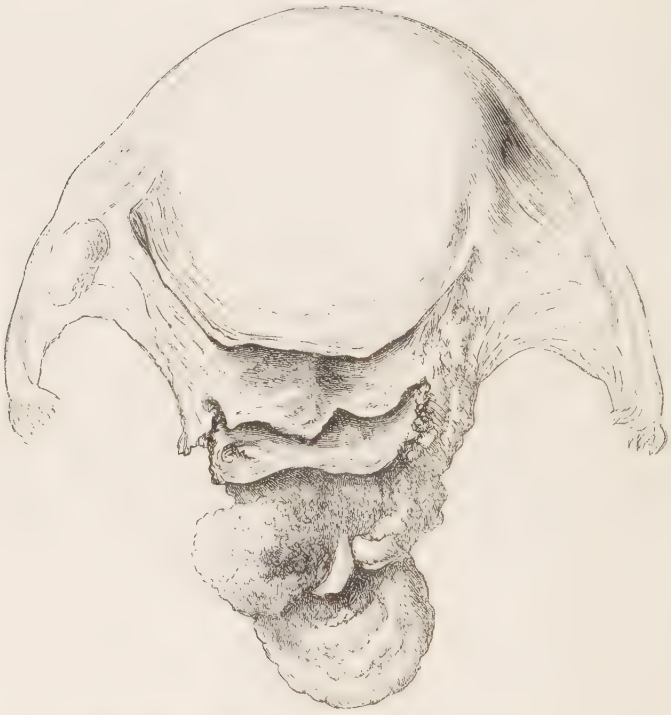
The second drawing is a view of the anterior surface, showing where the peritoneal covering of the uterus was divided, just where it is reflected on to the bladder. Just

below the line of divided peritoneum a darker line shows the opening into the uterine cavity through which the fœtus was drawn out. Below, in both drawings, the cervix altered by epithelioma is very well depicted.

Mr. Doran reported that the uterus and its appendages, when removed, 'weighed twenty-five ounces exclusive of the fœtus, and measured six inches in length.'

'The upper part of the uterus presented no abnormal appearance; anteriorly, immediately below the line of reflexion of the peritoneum on to the bladder, was a perfectly horizontal lacerated wound, about two inches in width, opening into the uterine cavity. The cut ends of the uterine artery could be seen, on each side, entering the uterus at its lateral and inferior part, between the anterior and posterior peritoneal coverings. The os was completely encircled by a cauliflower growth which extended very little into the uterine cavity, but invaded the cellular tissue to the right of the cervix. The portion of

vaginal wall removed formed a complete but very narrow fringe round the new formation. This growth, when examined microscopically by Mr. Eve and myself, showed all the characteristics of epithelioma. The right ovary contained a large corpus luteum of pregnancy, the left showed two corpora lutea in process of atrophy; the stroma of both was normal and free from dilated follicles.



'The fœtus weighed twenty-two and a half ounces, two and a half ounces lighter than the uterus and its appendages; it measured eleven inches and was ill-nourished, its body covered with a fine down, its eyelids gummed together, and its nails not extending to the tips of the fingers; the cord was nine and a half inches in length. The conclusion would be that it was about a week over the sixth month after conception.'

The condition of the patient after the operation was pretty much what we see in cases of ovariotomy; rather more pain and sickness than in a simple case, but the shock and symptoms

less urgent than in very complicated cases. Three small opiates were given within six hours after the operation. Sickness remained troublesome during the first week, and the patient was nourished with injections of beef tea and port wine, with a little laudanum occasionally. The highest temperature was 101·2°, and the most rapid pulse 128. During the night between the 28th and 29th, eight days after the operation, an untoward opening of the wound happened from frequent vomiting, but the stitches were carefully replaced by Mr. Thornton in my absence, and, though the temperature rose soon after a degree higher than it had been, the sickness ceased in the afternoon.

After this, though some of the stitches once more cut through, and the patient was kept in a state of irritation by an accidental scald on the leg by a hot-water cushion, there was not much to remark beyond a rather free discharge of serum from the vagina, which afterwards became purulent, and ceased within the third week. Twenty-eight days after operation she was moved into another room, but before this the pulse, temperature and digestive functions had been quite normal. Urine passed freely; she had neither pain nor sickness and she slept well. She returned to her home in Kent, by road, on November 21. When asked in what respect this confinement differed from those of her five children, she said she had always suffered from vomiting, but more this time than ever before; that the chief difference was that she had no trouble this time with her breasts, and that the most pain was from the scald on her leg. Her husband called on me in the first week of 1882 and told me that she was in good health, gaining strength, enjoying life, and had no vaginal discharge, pain, or irritation. This case then distinctly proves that a patient may recover after complete excision of a gravid uterus and both ovaries, and Mr. Doran's inspection and report of the specimen in the College Museum encouraged us to expect that as the diseased part had been completely removed, as it often is in cases of epithelioma of the lip or anus, where many years often elapse without any new morbid growth, there might be at least a considerable prolongation of life, and to be hopeful that the patient might escape a recurrence of the disease. But she came up to see me three times at intervals of a fortnight in February

and March 1882, with a very suspicious thickening of the vaginal cicatrix, although the general health was steadily improving.

If I were to repeat the operation I should modify its successive steps according to the gravid or non-gravid state of the cancerous uterus. When non-gravid, recent experience serves to prove that extirpation by the vagina is the safer method. When gravid, it is possible that dilatation of the cervix and emptying the uterine cavity as a preliminary measure might still enable the operator to act through the vagina. No case so treated, as far as my knowledge goes, has been recorded, and it is not easy to estimate the amount of risk which would have to be encountered. It seems probable that in nearly all cases of gravid cancerous uterus, either the abdominal, or a combined vaginal and abdominal, operation would afford the greatest chance of success. In either case a large elastic catheter or a canula, through the end of which diverging wires expand, like, but shorter than, those figured on page 169, would serve as a guide and safeguard in separating the uterus from the bladder; and if the abdominal operation should be selected, a large ring pessary, or a modified Zwancke's pessary, in the vagina, would afford better help in making the section of the vaginal wall round the neck of the uterus than the cotton plugs which I used. Of course the vagina ought to be thoroughly cleansed by sulphurous acid or some other disinfectant.

The position of the patient during the abdominal operation should be the same as for ovariotomy, but for a combined vaginal and abdominal operation it would be convenient to separate the thighs and flex the legs, carefully protecting them from cold. In any case a strong reflecting lamp should be provided and ready for use—say, for example, a good carriage lamp or a policeman's bull's-eye, until a cool, glowing electric light is perfected, such as we shall probably soon obtain by means of the Faure accumulator, and one of the incandescent lamps of Swan or Edison. Something of this kind, particularly if the spray be used, would aid greatly when vessels are being tied or sutures passed, unless the light in the room is unusually strong.

The length of the incision in the abdominal wall need not

be so long as that which I made, if, after exposing the uterus, the liquor amnii were evacuated by a trocar. The uterus would still further be diminished in size by dividing its wall and removing the fœtus, but it would be very desirable to avoid any interference with the placenta. In Porro's supra-vaginal amputation an elastic ligature passed round just above the vagina might be tried with advantage, but of course is out of the question if the cervix has to be removed.

After withdrawing the uterus from the abdominal cavity a few sutures should be inserted so as to bring together the edges of the upper part of the opening in the abdominal wall, and close it over a flat sponge. This prevents the intestines from escaping and protects them from the cooling of the spray when it is used. I do not think I need say more about the suppression of hæmorrhage by tying the spermatic arteries or the use of pressure-forceps than will be found in my narrative of the case. By careful dissection, and the guide of a catheter, the uterus may be separated from the bladder without much danger, but I do not yet see any mode of certainly providing against the mischance of tying or dividing one or both ureters. I fear that with all possible care it is an accident which may occasionally prove unavoidable.

Mr. Nunn suggested to me last year that removal of the entire uterus would be more easy if the organ were first divided into two parts by cutting it through in the median line and removing first one side and then the other. He founded this proposal on his anatomical observations brought before the Pathological Society in 1857, and published in the ninth volume of the 'Transactions.' Professor Müller, of Berne, has more recently made a similar recommendation, as a modification of total extirpation of the uterus by the vagina. He has not carried his proposal into practice, but he thinks that the necessary ligatures would be more easily applied and be much less likely to slip if, after drawing down the uterus, it can be 'split into two symmetrical halves in a vertical direction. Then each half of the uterus with its ligament could be drawn backwards,' the ligatures applied, and the uterus cut away ('Centralblatt für Gynäkologie,' 1882, No. 8).

When the abdominal operation is performed, my own present feeling is in favour of the intra-peritoneal method of

securing the vessels, with suture of the peritoneal edges, and complete closure of the incision in the abdominal wall. Olshausen's recent experience with the elastic ligature, proving that the ligature and the parts compressed by it may be left within the abdominal cavity with most encouraging results, strengthens my impression in favour of the intra-peritoneal ligature. But I freely admit, at the same time, that recent cases by Dr. Bantock, Mr. Thornton, and Mr. Meredith prove that the extra-peritoneal treatment of the pedicle, or of the root of outgrowths from the uterus, or portions of the uterus included in a ligature or compressing wire, may be very safely and successfully effected by Kœberlé's *serre-nœud*, which is used as a clamp, prevented from being drawn inwards by two strong pins passed through close to the wire loop, and the edges of the wound then carefully closed around the stump.

Most operators have thought it necessary to arrange for drainage after separating the uterus from its vaginal attachments all round. But I do not see that drainage can be more necessary in this operation than after the removal of uterine or ovarian tumours, where I, at least, have almost completely abandoned it. I believe it to be more important effectually to close the opening between the peritoneal cavity and the vagina by sutures, than to keep up a sinus by a drainage tube. Indeed, I should very much fear that the latter course would be hazardous. It has also been proposed to use two sets of sutures, one for the vaginal mucous membrane and one for the peritoneum and broad ligaments. My present feeling is that the vaginal sutures are unnecessary, and may possibly be injurious by leading to collections of blood or serum in the pelvic cellular tissue.

As I have never performed a combined vaginal and abdominal operation for the removal of a non-gravid uterus, I hesitate to say much about the details of the procedure; but I think it extremely probable that the operation as hitherto practised might be very much simplified by drawing down the uterus, separating its attachments to the vaginal wall all round as near to the uterine substance as possible, or exactly where the peritoneum is reflected off from its walls, securing any bleeding vessel as it is divided by pressure-forceps, not using any ligatures, but leaving the forceps hanging out of the vagina

for two or three days until all danger of hæmorrhage has ceased. They might be so arranged as to serve the double purpose of stopping bleeding, and of bringing the opposite sides of the vagina together so as to render peritoneal sutures superfluous. It is very unlikely that if the forceps were left untouched for two or three days any bleeding would take place; and if it did, there would be no more difficulty in applying a ligature than in the first instance. Further, it appears to me that sufficient attention has not been paid in any of these operations to preliminary compression of the abdominal aorta by tourniquet as a safeguard or preventive of bleeding, or to compression of the aorta by the fingers of an assistant when bleeding occurs during the progress of the operation. It is also probable that Mr. Davey's plan of compressing the iliacs by a sound passed up the rectum might also occasionally prove useful. I can imagine it to be quite possible in persons where the abdominal wall is lax, either by a modified tourniquet or by the hand of an assistant, so to force the parietes backwards and below the brim of the pelvis, as to push the uterus downwards, keep the intestines in the upper part of the abdominal cavity, and at the same time to check the circulation in the aorta or the iliacs, and thus render the operation almost bloodless.

More than fifty years ago, Blundell, after long consideration, based upon a series of experiments to show the effect of peritoneal section and manipulation, and fully aware of the difficulties and risks of the operation, proposed excision of the cancerous uterus. He brought forward his views with no very sanguine expectations, and simply advocated the extirpation as a last resource, which might perchance restore a measure of life to a few of the many women who were menaced with speedy and inevitable death. He carried out his proposition for the first time in September 1828. He did four cases, three of which proved fatal—two within six hours of the operation, one after thirty-nine hours—and one lived a year, when on examination cancerous masses were found in the pelvis. All Blundell's operations were performed through the vagina. A very interesting account of them, and of the thoughts and experiments which led him to attempt them, may be found in his work on 'Obstetric Medicine,' published in 1840, from page 752 to page 784.

Three deaths out of four cases, and a recurrence of the

disease within a year in the only patient who recovered, will account for the fact that the idea of extirpation of the cancerous uterus was not revived in England until 1878, when, in the Hunterian Lectures at the College of Surgeons, I made known Freund's operation of excision through the abdominal wall. It has not yet been done in England with any good results. In the two instances of which I have heard, death has followed after a short interval. And it cannot be said to have proved successful in Germany and Italy; but the experience of Freund himself and other operators up to the end of 1880 has been collected, and Olshausen has commented on the particulars of 94 cases. Of these 24 survived the operation; but in nearly every case there was a return of the disease, and in some of them after a very short time—an experience corresponding almost exactly with that of Blundell. Among the fatal cases some died of shock, some from bleeding, and others from septic peritonitis. Six times one of the ureters was divided. In two other cases the same accident befel both ureters, and four of the operations were never completed. Immediate consequences so discomfiting, and results so negative, could not be accepted as the ultimatum of surgical science, and operators turned their attention to the mode of excision. Delpech had a long time before, in 1830, indicated a combined hypogastric and vaginal operation, and now it was extraction by the vagina, long ago practised by Blundell, that came again to be adopted. Olshausen has accumulated the history of 44 such operations, showing an outcome of 29 recoveries, 12 deaths, and 3 incomplete operations. We have here an advance of more than 40 per cent. in favour of this procedure, the relative mortality being for the abdominal section about 75 per cent.; that for the vaginal extraction not quite 30 per cent. It is true that calculations upon such small numbers are anything but conclusive. Still the indication is manifestly that a step has been made in the right direction, and it is that which I should myself follow. Porro's operation, as we have seen, was a supra-vaginal amputation as a substitute for the Cæsarean section; and Bischoff of Basle in 1879 removed a uterus, the cancerous cervix of which impeded delivery, from a patient 41 years of age, and at the thirty-fourth week of pregnancy. She, however, died eleven hours after, the left ureter having been tied. It thus seems that

my own case at present is the only one of the kind followed by recovery and a temporary restoration to health.

Professor Billroth of Vienna, in a letter to me, dated Vienna, November 18, 1881, says:—

'Your Porro-Freund case has interested me very much, as a similar case occurred to me three months ago. A strong woman, about 37 years of age, four months pregnant, had extensive carcinoma of the whole cervix and part of the vagina. The whole uterus was extirpated by the vagina. Bleeding was considerable, but recovery was rapid. Unfortunately it was necessary to cut away part of the bladder, leaving a hole in the bladder, and a large hole (*Riesenloch*) in the peritoneum. I stopped up both with plugs of iodoform gauze. These were left for eight days, and were then removed. There was no sepsis, but healing. The vesical fistula remains for future treatment. In another case, similar except that the uterus was not gravid, one ureter was wounded. The large peritoneal opening was plugged with iodoform gauze, and the patient recovered. But I cannot heal the ureter fistula. Still the disinfecting power of iodoform is by these cases clearly established. By no other means could the decomposition of the wound secretion and of the urine flowing through the fistula have been prevented, and death would have been certain.

'Unfortunately my very successful results of total extirpation of the carcinomatous uterus *per vaginam* are very disappointing so far as regards relapse. Even in the two cases just described, where I extirpated up to the extreme limits of anatomical possibility, there is already recurrence. Of what use are all our pains and art!' (*'Was nutzt da all' unsre Mühe und Kunst!'*)

The question of the extirpation of the cancerous uterus has a very different aspect during pregnancy and in the non-gravid state. For a pregnant woman something must be done to save her life. When not pregnant the question is one of expediency, not of necessity, and it seems probable that there will be very few cases in which a positive diagnosis can be made when the disease has not extended so far as to put excision beyond all reasonable hope of success. In the early stages diagnosis is often doubtful, and so serious an operation would not be submitted to if recommended. At a later stage, when a

more positive opinion is attainable, and the disease is apparently confined to the cervix, destruction by caustics, or the actual cautery, or cutting or scraping away of the diseased parts, followed by the application of the chloride of zinc or some other corrosive agent, or amputation of the cervix, are all methods of treatment which would have to be considered before proposing total extirpation. And although the results of these proceedings have not been very satisfactory so far as extension or recurrence of the disease is concerned, yet the immediate danger to life is very small compared with that attending removal of the whole uterus. In many cases great relief is obtained for a time, loss of blood and offensive discharges are stopped, pain is lessened and the general health improved. I have known two cases in which, after removal of the diseased cervix and the use of the actual cautery, the patients died about five years later on of some other disease, no return of that of the uterus having been observed. But in no other case which has been subjected to the same treatment by me has the relief lasted many months; and of course it can only be expected to be at all useful when the disease is confined to the lower segment of the uterus.

In cases where the fundus or body is affected, if any surgical measures are admissible, excision by the vagina would be the resource to which our present knowledge inclines us. And if it be done sufficiently early, by operators who have made themselves masters of all the details of manipulation by practice on the dead body, and by carefully studying the records of the cases hitherto published, we need not despair of establishing for excision of the cancerous uterus a higher scale of success, with fewer failures and more recoveries, and of being able to rescue from their misery as large a proportion of our patients as any surgeons can claim to do when they exercise their art for the removal of cancer from other parts of the body.

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INDEX.

Acton's Reproductive Organs, 14
Adams (W.) on Clubfoot, 11
——————— Contraction of the Fingers, 11
——————— Curvature of the Spine, 11
Allan on Fever Nursing, 7
Allingham on Diseases of the Rectum, 13
Anatomical Remembrancer, 4
Anderson (McC.) on Eczema, 13
Aveling's Influence of Posture on Women, 6
Balfour's Diseases of the Heart and Aorta, 9
Balkwill's Mechanical Dentistry, 13
Bantock on Rupture of the Female Perineum, 6
Barclay's Medical Diagnosis, 8
Barnes on Obstetric Operations, 5
——— on Diseases of Women, 5
Beale's Microscope in Medicine, 8
——— Slight Ailments, 8
Bellamy's Surgical Anatomy, 3
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——————— on Nutrition, 10
Bentley and Trimen's Medicinal Plants, 7
Bentley's Manual of Botany, 7
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Bigg (R. H.) on the Orthopragms of Spine, 11
Binz's Elements of Therapeutics, 7
Black on the Urinary Organs, 14
Bose's Rational Therapeutics, 7
——— Recognisant Medicine, 7
Braune's Topographical Anatomy, 3
Brodhurst's Anchylosis, 11
——————— Orthopædic Surgery, 11
Bryant's Practice of Surgery, 11
Bucknill and Tuke's Psychological Medicine, 5
Bulkley on Eczema, 13
——— on Diseases of the Skin, 13
Burdett's Cottage Hospitals, 5
——————— Pay Hospitals, 5
Burnett on the Ear, 12
Burton's Midwifery for Midwives, 5
Butlin's Sarcoma and Carcinoma, 13
Buzzard's Diseases of the Nervous System, 9
Carpenter's Human Physiology, 4
Carter (H. V.) on Spirillum Fever, 7
Carter (W.) on Renal and Urinary Diseases, 14
Cayley's Typhoid Fever, 9
Charteris' Practice of Medicine, 8
Clark's Outlines of Surgery, 10
Clay's (C.) Obstetric Surgery, 6
Cobbold on Parasites, 14
Coles' Dental Mechanics, 13
——— Deformities of the Mouth, 13
Cormack's Clinical Studies, 8
Coulson on Stone in the Bladder, 14
——— on Syphilis, 14
——— on Diseases of the Bladder, 14
Cripps' Cancer of the Rectum, 14
Curling's Diseases of the Testis, 13
Daguenet's Manual of Ophthalmoscopy, 12
Dalby's Diseases and Injuries of the Ear, 12
Dalton's Human Physiology, 4
Day on Diseases of Children, 6
—— on Headaches, 9
De Chaumont's Sanitary Assurance, 4
Dobell's Lectures on Winter Cough, 8
——— Loss of Weight, &c., 8
——— Mont Dore Cure, 8
Domville's Manual for Nurses, 7
Druitt's Surgeon's Vade-Mecum, 11
Duncan on the Female Perineum, 5
——— on Diseases of Women, 5
Dunglison's Medical Dictionary, 14
Ellis's Manual for Mothers, 6
——— ——— of the Diseases of Children,
Emmet's Gynæcology, 5
Eulenburg and Guttmann's System of Nerves, 9
Fayrer's Observations in India, 7
——— Tropical Dysentery and Diarrhœa, 7
Fenwick's Chronic Atrophy of the Stomach, 8
——————— Medical Diagnosis, 8
——————— Outlines of Medical Treatment, 8
Fergusson's Practical Surgery, 10
Flint on Phthisis, 8
—— on Clinical Medicine, 8
Flower's Diagrams of the Nerves, 4
Foster's Clinical Medicine, 8
Fox's (C. B.) Examinations of Water, Air, and Food, 4
Fox's (G. H.) Photographs of Cutaneous Syphilis, 14
——————————————— Skin Diseases, 13
Fox's (T.) Atlas of Skin Diseases, 13
Frey's Histology and Histo-Chemistry, 4
Fulton's Text-Book of Physiology, 4
Galabin's Diseases of Women, 6
Gamgee's Fractures of the Limbs, 11
——————— Treatment of Wounds, 11
Gant's Diseases of the Bladder, 14
Gaskoin on Psoriasis or Lepra, 13
Gay on Hæmorrhoidal Disorder, 13
Gill on Indigestion, 10
Glenn's Laws affecting Medical Men, 14
Godlee's Atlas of Human Anatomy, 3
Gowers' Diseases of the Spinal Cord, 9
——————— Epilepsy, 9
——————— Medical Ophthalmoscopy, 9
——————— Pseudo-Hypertrophic Muscular Paralysis, 9
Habershon's Diseases of the Abdomen, 9
——————————————— Stomach, 9
——————— Pneumogastric Nerve, 9
Hamilton's Nervous Diseases, 9
Hardwicke's Medical Education, 14
Harris on Lithotomy, 14
Harrison's Surgical Disorders of the Urinary Organs, 14
——————— Prevention of Stricture, 14
Heath's Injuries and Diseases of the Jaws, 10
——————— Minor Surgery and Bandaging, 10
——————— Operative Surgery, 10
——————— Practical Anatomy, 3
——————— Surgical Diagnosis, 10
Hemming on the Laryngoscope, 12
Higgens' Ophthalmic Out-patient Practice, 11
Hillis' Leprosy in British Guiana, 13
Hogg's Indian Notes, 7
Holden's Dissections, 3
——————— Human Osteology, 3
——————— Landmarks, 3
Holmes' (G.) Guide to Use of Laryngoscope, 12
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Hood on Gout, Rheumatism, &c., 9
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Horton's Tropical Diseases, 7
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——————— Rare Diseases of the Skin, 13
Huth's Marriage of Near Kin, 4
Ireland's Idiocy and Imbecility, 5
Irvine's Relapse of Typhoid Fever, 8
James on Sore Throat, 12
Jones' (C. H.) Functional Nervous Disorders, 9
Jones (C. H.) and Sieveking's Pathological Anatomy, 4
Jones' (H. McN.) Aural Surgery, 12
——————— ——— Atlas of Diseases of Membrana Tympani, 12
Jones' (T. W.) Ophthalmic Medicine and Surgery, 11
Jordan's Surgical Enquiries, 11
Lancereaux's Atlas of Pathological Anatomy 4
Lane's Lectures on Syphilis, 14
Lee (H.) on Syphilis, 14
Leared on Imperfect Digestion, 10
Lewis (Bevan) on the Human Brain, 4
Liebreich's Atlas of Ophthalmoscopy, 11
Liveing's Megrim, Sick Headache, &c., 10
Lucas's Indian Hygiene, 8
Macdonald's (A.) Chronic Disease of the Heart, 6
Macdonald's (J. D.) Examination of Water, 4
Macewen's Osteotomy: Knock-knee, Bow-leg, &c., 11
Mackenzie on Diphtheria, 12
——————— on Diseases of the Throat and Nose, 12
Maclise's Dislocations and Fractures, 11
——————— Surgical Anatomy, 3
MacMunn's Spectroscope in Medicine, 8
Macnab's Medical Account Books, 14
Macnamara's Diseases of Bones and Joints, 11
——————— ——————— the Eye, 12
Madden's Principal Health-Resorts, 10
Martin's Military and State Medicine, 5
Mason on Hare-Lip and Cleft Palate, 12
——— on Surgery of the Face, 12
Mayne's Medical Vocabulary, 14
Mitchell (R.) on Cancer Life, 13
Mitchell's (S. Weir) Nervous System in Women, 6

[*Continued on the next page*

Moore's Family Medicine for India, 7
——— Health Resorts for Tropical Invalids, 7
Morris' (H.) Anatomy of the Joints, 3
Nettleship's Diseases of the Eye, 12
Nunn's Cancer of the Breast, 13
Ogston's Medical Jurisprudence, 4
Osborn on Diseases of the Testis, 13
——— on Hydrocele, 13
Parkes' Practical Hygiene, 5
Pavy on Diabetes, 10
——— on Food and Dietetics, 10
Peacock's Diseases of the Heart, 9
Pharmacopœia of the London Hospital, 7
Phillips' Materia Medica and Therapeutics,
Pirrie's Principles and Practice of Surgery, 11
Pollock on Rheumatism, 9
Pridham on Asthma, 8
Purcell on Cancer, 13
Radford's Cæsarean Section, 5
Ralfe's Morbid Condition of the Urine, 14
Ramsbotham's Obstetrics, 6
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Royle and Harley's Materia Medica, 7
Sanderson's Physiological Handbook, 4
Sansom's Diseases of the Heart, 9
——— Antiseptic System, 9
Savage on the Female Pelvic Organs, 6
Sayre's Orthopædic Surgery, 11
Schroeder's Manual of Midwifery, 6
Sewill's Dental Anatomy, 12
Sheppard on Madness, 5
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Sieveking's Life Assurance, 14
Smith's (E.) Wasting Diseases of Children, 6
——————— Clinical Studies, 6
Smith's (Henry) Surgery of the Rectum, 14
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——————— Gynæcology, 6
Smith (Priestley) on Glaucoma, 12
Sparks on the Riviera, 10
Squire's Companion to the Pharmacopœia, 7
Squire's Pharmacopœias of London Hospitals, 7
Stillé and Maisch's National Dispensatory, 7
Sullivan's Tropical Diseases, 7
Swain's Surgical Emergencies, 10
Swayne's Obstetric Aphorisms, 6
Taft's Operative Dentistry, 12
Taylor's Medical Jurisprudence, 4
——— Poisons in relation to Medical Jurisprudence, 4
Teale's Dangers to Health, 5
Thomas on Ear and Throat Diseases, 12
Thompson's (Sir H.) Calculous Disease, 13
——————— Diseases of the Urinary Organs, 13
——————— Diseases of the Prostate, 13
——————— Lithotomy and Lithotrity, 13
Thompson's (Dr. H.) Clinical Lectures, 8
Thorowgood on Asthma, 8
——————— on Materia Medica and Therapeutics, 7
Thudichum's Pathology of the Urine, 14
Tibbits' Medical and Surgical Electricity, 10
——— Map of Motor Points, 10
Tidy and Woodman's Forensic Medicine, 4
Tilt's Change of Life, 6
——— Uterine Therapeutics, 6
Tomes' (C. S.) Dental Anatomy, 12
——— (J. & C. S.) Dental Surgery, 12
Van Buren on the Genito-Urinary Organs, 14
Veitch's Handbook for Nurses, 6
Virchow's Post-mortem Examinations, 4
Wagstaffe's Human Osteology, 3
Walker's Ophthalmology, 12
Waring's Indian Bazaar Medicines, 7
——— Practical Therapeutics, 7
Warner's Guide to Medical Case-Taking, 8
Waters' (A. T. H.) Diseases of the Chest, 8
Waters (J. H.) on Fits, 9
Wells (Spencer) on Ovarian and Uterine Tumours, 6
West and Duncan's Diseases of Women, 5
Whistler's Syphilis of the Larynx, 12
Whitehead's (J. L.) Climate of the Undercliff, 10
Whittaker's Primer on the Urine, 14
Wilks' Diseases of the Nervous System, 9
Wilks and Moxon's Pathological Anatomy, 4
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——————— Lectures on Dermatology, 13
Wilson's (G.) Handbook of Hygiene, 5
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